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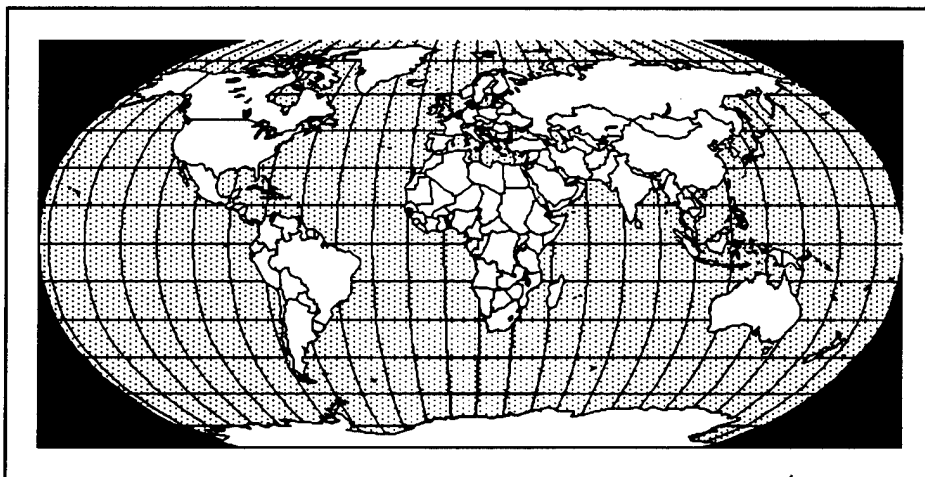
USACERL Technical Report 98/28  
December 1997

19980202 022

# Foreign Voltages and Frequencies Guide

by

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Foreign countries around the world use different electrical standards for voltage and frequency than those of the United States. Electrical equipment designed for 60 Hertz may or may not operate properly in a 50 Hertz environment. Similarly, electrical equipment designed for 50 Hertz may or may not operate properly in a 60 Hertz environment. Because of these different electrical standards, research was conducted to identify the voltage and frequency standards of various foreign countries, as well as to provide guidance on the operation of various classes of

equipment in different voltage and frequency environments.

This study identifies the various low and medium voltage levels, along with the system frequencies, used by countries around the world. This study also identifies the classes of equipment that are sensitive to voltage and frequency, providing guidance for their operation in different environments. Finally, a listing of U.S. manufacturers of 50 Hertz electrical equipment is provided for reference purposes.

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Form Approved  
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Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave Blank)		2. REPORT DATE December 1997		3. REPORT TYPE AND DATES COVERED Final	
4. TITLE AND SUBTITLE Foreign Voltages and Frequencies Guide				5. FUNDING NUMBERS IAO No. IA10301690	
6. AUTHOR(S) Larry M. Windingland, Scott A. Steele, Kevin K. Heyen, Hannon T. Maase, and Franklin H. Holcomb					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Construction Engineering Research Laboratories (USACERL) P.O. Box 9005 Champaign, IL 61826-9005				8. PERFORMING ORGANIZATION REPORT NUMBER  TR 98/28	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Center for Public Works (USACPW) ATTN: CECPW-EE 7701 Telegraph Road Alexandria, VA 22312-3862				10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES Copies are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.					
12a. DISTRIBUTION / AVAILABILITY STATEMENT  Approved for public release; distribution is unlimited.				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>Foreign countries around the world use different electrical standards for voltage and frequency than those of the United States. Electrical equipment designed for 60 Hertz may or may not operate properly in a 50 Hertz environment. Similarly, electrical equipment designed for 50 Hertz may or may not operate properly in a 60 Hertz environment. Because of these different electrical standards, research was conducted to identify the voltage and frequency standards of various foreign countries, as well as to provide guidance on the operation of various classes of equipment in different voltage and frequency environments.</p> <p>This study identifies the various low and medium voltage levels, along with the system frequencies, used by countries around the world. This study also identifies the classes of equipment that are sensitive to voltage and frequency, providing guidance for their operation in different environments. Finally, a listing of U.S. manufacturers of 50 Hertz electrical equipment is provided for reference purposes.</p>					
14. SUBJECT TERMS equipment evaluation voltage levels electrical standards  foreign countries				15. NUMBER OF PAGES 144	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT		

## Foreword

This study was originally published in March of 1993 as USACERL Technical Report FE-93/19, "Survey of U.S. Manufacturers and Vendors of 50 Hz-Sensitive Equipment for Overseas Applications." It was conducted for the U.S. Department of State under Inter-Agency Order (IAO) No. IA10301690; Work Unit IA10301690, "Overseas Power Supply Electrical Equipment." The technical monitor was John Lemanis, Office of Foreign Building Operations, Division of Building and Design and Engineering.

The update and revision to this document was conducted for the U.S. Army Center for Public Works (USACPW), Electrical Division (CECPW-EE) under Military Interdepartmental Purchase Request (MIPR) No. W26HBF62700887 dated 30 September 1996. The technical monitor was Ronald K. Mundt, CECPW-EE.

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**Distribution**



# 1 Introduction

## Background

The Electrical Division of the Center for Public Works (CECPW-EE) provides electrical distribution guidance and field assistance to Army Installations worldwide. USACERL supports these efforts by providing research and development results for technical transfer to the field.

Foreign countries around the world use different electrical standards for voltage and frequency than those of the United States. Some electrical equipment will operate properly at an electrical frequency of either 50 or 60 Hz. Equipment designed for 60 Hz that will not operate properly at 50 Hz is termed "50 Hz sensitive," and equipment designed for 50 Hz that will not operate properly at 60 Hz is termed "60 Hz sensitive." Because of these different electrical standards, guidance is required to identify the voltage and frequency standards of various foreign countries for both medium and low voltage systems, as well as to identify the classes of equipment that are sensitive to voltage and frequency.

## Objectives

The objectives of this study were to: (1) identify the various low and medium voltage levels, along with the system frequencies, used by countries around the world, (2) identify the classes of electrical equipment that are sensitive to frequency and voltage, (3) analyze equipment derating methods for different voltage and frequency environments, and (4) list U.S. manufacturers and vendors for each class of equipment identified as 50 Hz sensitive.

## Approach

Researchers used a library search to locate a listing of electrical standards of countries around the world. Three documents were located and used to generate Appendix A, which lists frequency and single- and three-phase voltage levels by country: a report by the U.S. Department of Commerce, Bureau of Industrial

Economics, titled *Electric Current Abroad—1984 Edition*; British Standards Institution (BSI) Publication TH20338, *World Electricity Supplies* (1975), and a Utility Data Institute (Division of McGraw-Hill) publication, *International Directory of Electric Utilities* (January 1996).

The types of equipment sensitive to 50 Hz and low and medium voltage levels are discussed in Chapter 2. The several broad categories were divided into classes or types of equipment. The listing of equipment by class was based on *Means Mechanical and Electrical Cost Data* books. A list of vendors for each class and subclass of equipment was developed using the *Information Handling Services* microfilm list and a cross-reference of vendors. The vendors offering the widest range of specifications were preferentially listed for each equipment class in Appendix B.

Derating factors were then developed as discussed in Chapter 3 for 60 Hz equipment that was not produced in 50 Hz configurations. This derating information will be used when special or unique equipment cannot be purchased from the listed U.S. manufacturers in 50 Hz compatible form.

## 2 Equipment Sensitive to Frequency and Voltage Levels

### Theoretical Overview

Equipment sensitive to frequency and/or voltage is designed to operate within certain tolerances. Most equipment is sensitive to large changes in the supply voltage level because more current will flow through a device when the voltage level of the supply is increased (the current through the device is equal to the voltage across the device divided by the impedance of the device). When a larger current flows, the heat dissipated in the device increases (the heat dissipated by the device is proportional to the square of the current). Thus, doubling the voltage will typically double the current, resulting in the device dissipating four times the heat. Most devices cannot tolerate this amount of heat and cannot operate reliably with a supply voltage level more than 10 percent or so higher than their rated voltage.

An additional complication arises in the case of devices that use magnetic coupling. Since most electrical equipment depends on a magnetic field as the medium for transferring and converting energy, the following paragraphs discuss a basic transformer to explain how the magnetic circuit depends on the frequency and amplitude of the applied voltage. This explanation provides the basis for much of the discussion on 50 Hz sensitive equipment that follows, and the discussion on equipment derating in Chapter 3.

A transformer enables electrical energy to be transferred with high efficiency from one voltage level to another at the same frequency. Consider a simplified view of a transformer with a sinusoidal voltage source,  $v$ , applied to the primary circuit and the secondary circuit open, as shown in Figure 1. The operation of the transformer depends on several natural laws including the following:

1. A sinusoidal, time-varying flux,  $\phi$ , linking a conducting circuit produces a voltage,  $e$ , in the circuit proportional to  $d\phi/dt$  (i.e., Faraday's law of induction).
2. The algebraic sum of the voltages around any closed path in a circuit is zero (i.e., Kirchhoff's voltage law).

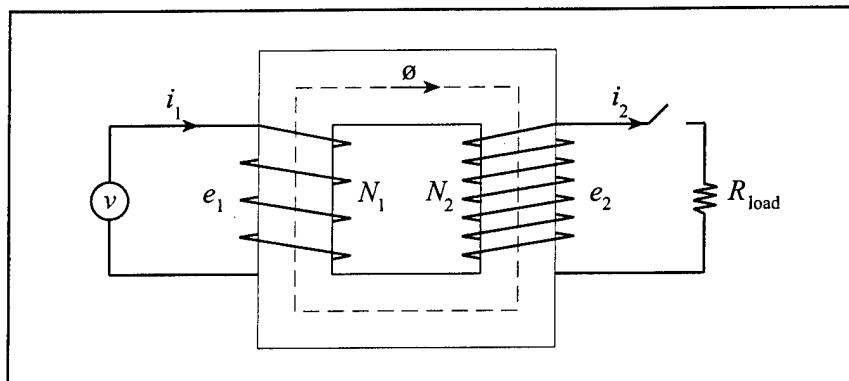


Figure 1. Simplified two-winding transformer.

3. The voltage,  $v$ , in a circuit induced by a changing flux is always in the direction in which current would have to flow to oppose the changing flux (i.e., Lenz's law).

When the sinusoidal voltage,  $v$ , is impressed onto the primary electrical winding of  $N_1$  turns, it is expected that a sinusoidal current,  $I$ , will begin to flow in the circuit, which in turn will produce a sinusoidally varying flux,  $\phi$ . For simplicity, it is assumed that all of the flux set up by the primary circuit lies within the transformer's iron core and it therefore links with all the turns of both windings. If the flux at any instant is represented by the equation:

$$\phi = \phi_m \sin 2\pi ft \quad [\text{Eq 1}]$$

where:

$\phi_m$  = the maximum value of the flux

$f$  = the frequency

$t$  = time,

it follows from Faraday's law (i.e.,  $e = N d\phi/dt$ ) that the instantaneous voltage  $e_1$  induced in the primary winding is:

$$e_1 = 2\pi f N_1 \phi_m \cos 2\pi ft \quad [\text{Eq 2}]$$

The polarity of  $e_1$  will be in accordance with Lenz's law, and hence will be in opposition to the impressed voltage,  $v$  (Figure 1). The root mean square (rms) value of  $e_1$  is

$$E_1 = (2\pi/\sqrt{2})fN_1\phi_m = 4.44fN_1\phi_m \quad [\text{Eq 3}]$$

Remembering Kirchhoff's voltage law, and assuming that the winding resistance is relatively small,  $E_1$  must be approximately equal to  $V$ , where  $V$  represents the rms value of the applied voltage. One important result from this equation is that the value of the maximum flux,  $\phi_m$ , is determined by the applied voltage. In other words, for a given transformer, the maximum value of the flux is determined by the amplitude and frequency of the voltage applied to the primary winding.

The same flux that caused  $E_1$  in the primary winding will also induce a voltage across the terminals of the secondary winding. Thus, the only difference in the rms values of the two voltages will come from the difference in the number of turns. If the secondary winding has  $N_2$  turns, the secondary voltage can be written as:

$$E_2 = 4.44fN_2\phi_m \quad [\text{Eq 4}]$$

Dividing Equation 3 by Equation 4 gives the familiar relationship:

$$E_1/E_2 = N_1/N_2 \quad [\text{Eq 5}]$$

Consider next when the transformer is loaded with a resistor  $R_{\text{load}}$  by closing the switch in the secondary circuit. If the core flux is in the direction indicated (with the flux increasing), then by Lenz's law, the polarity of  $E_2$  will be such that current  $I_2$  will flow in the secondary winding in attempt to decrease the core flux. The amount of secondary current that will flow will depend on the value of  $R_{\text{load}}$  (i.e.,  $I_2 = E_2/R_{\text{load}}$ ), and the power delivered to the load will equal  $E_2I_2$ .

It is important to understand the mechanism by which the power is transferred from the primary circuit to the load. Consider a situation when current is suddenly allowed to flow in the secondary winding by closing the switch. As mentioned previously, the action of this current will be to decrease the core flux. Decreasing the core flux would lower the value of  $E_1$ , which would be in violation of Kirchhoff's voltage law (KVL). Since KVL must be satisfied, more current must flow in the primary winding. The steady-state result is that the primary current will increase

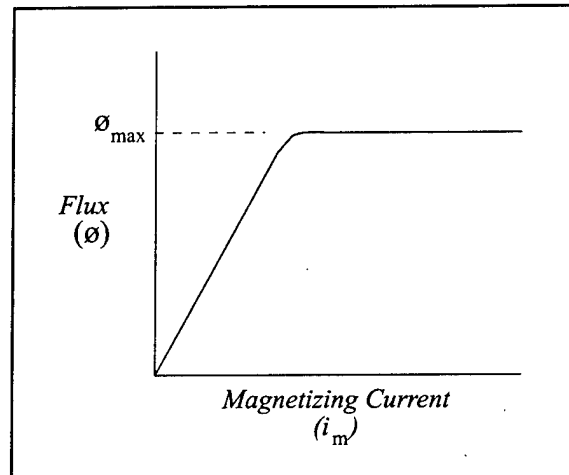


Figure 2. Magnetization curve for the transformer's iron core.

to the value sufficient to neutralize the demagnetizing action of the secondary current. It is important to realize that the resultant flux in the core remains the same regardless of the loading on the transformer. If the level of core flux were to vary with load, then  $E_1$  and  $E_2$  would also vary, which is contrary to what is observed in practice.

An iron core is used in transformers because it provides a good path for magnetic flux and directs the flux so it predominantly links all of the turns in each winding. However, the core has its limitations and can carry only so much flux before it becomes saturated. Core saturation occurs when all of the magnetic domains of the iron align, resulting in a condition in which no further increase in flux density over that of air can be obtained. Consider the magnetizing curve in Figure 2 showing flux versus magnetizing current, where the magnetizing current  $i_m$  is the steady-state component of current required to establish the resultant flux level in the iron core for the transformer. It is typical for a transformer, or any other magnetic circuit, to be designed for operation close to the "knee" of this curve (i.e.,  $\phi_{max}$ ) to use as much of the iron core as possible. Beyond  $\phi_{max}$ , the iron saturates and it becomes extremely difficult to further increase the flux level. The curve implies that forcing the iron core into saturation can result in a significant increase in the value of the magnetizing current, and hence, can cause the windings to become overloaded and the transformer to overheat.

This study is concerned primarily with equipment sensitive to 50 Hz and voltage levels since the equipment will be used overseas where voltage frequencies and levels typically are different from those in the United States. This equipment could be listed by item, but a more useful format results when it is divided into classes and subclasses of equipment from which manufacturers for specific pieces of equipment

can be easily selected. Following this format, listed below are the broad classes of equipment sensitive to 50 Hz and building voltage levels. Each section contains specific classes and subclasses of equipment, as listed in Appendix B. Additionally, each section describes why the equipment is sensitive to voltage frequency and/or level. Equipment that does not readily fit into any other category is listed in the section titled "Other Electrical Equipment" (p 18).

## HVAC

Heating, ventilation, and air-conditioning (HVAC) equipment includes boilers, furnaces, water chillers, humidifiers, fans, compressors, evaporators, and related equipment. Certain issues must be considered when using HVAC equipment in 50 Hz and alternate voltage environments, including the motor speed and step-down transformers for power supplies, which are discussed below.

The objective of an HVAC system is to provide the necessary heating and cooling to a building in accordance with the design specifications. Typically, alternating current (AC) motors are used in HVAC systems to drive fans, pumps, and compressors. When 60 Hz motor is run off a 50 Hz supply, the shaft speed of the motor is reduced by 5/6 since the motor speed is directly related to the frequency of the applied voltage. This speed will affect all direct-drive applications. For example, a pump that is directly coupled to the motor shaft will transfer less fluid over time if the shaft speed is reduced. Consequently, direct-drive HVAC applications must be derated to account for the reduced motor speed. However, for driven equipment that is tied to the motor through adjustable pulleys, the speed of the driven device can be increased to the necessary level.

Regardless of how the driven equipment is coupled to the motor, the 60 Hz motor must still operate within its rating in the 50 Hz environment. For the motor to deliver the same mechanical power at a lower speed, it must deliver more torque since output power equals torque times the shaft speed. If the motor delivers more torque, more current will flow in the motor and an overloaded condition may result. Hence, a 60 Hz motor may have to be derated to handle the extra current flow.

Another concern with operating a 60 Hz motor with a 50 Hz voltage source is with saturating the iron core of the motor. Like the transformer, the maximum value of flux in the core depends directly on the amplitude of the applied voltage and inversely on the frequency. Assuming that the same voltage level is applied to the 60 Hz motor in the 50 Hz environment, the reduction in frequency to 50 Hz would require an increase in core flux of 20 percent (i.e., 6/5 of its 60 Hz level). If the iron

core of the motor is unable to provide the extra flux, the core will saturate, and a significant increase in the stator currents can result, causing the motor to overheat.

Step-down transformers typically are needed to transform local voltage levels to the levels the equipment is designed for. In most cases, the equipment contains some sort of step-down transformer that typically has to be changed to convert the higher input voltage to the same output voltage. In cases where no step-down transformer is in the equipment, one must be added to avoid burning out components by subjecting them to a higher supply voltage. Determining the need for a step-down transformer and adding it to the equipment is easily accomplished, and is discussed further in Chapter 3.

Equipment designations in Appendix B are divided into mechanical ("M" prefix) and Electrical ("E" prefix). The classes of equipment that fall under the HVAC classification are M10100, M10200, M10300, M10400, M10700, M10900, M11000, M11100, M11200, and M11300. Each class has at least one subclass, and each subclass lists U.S. manufacturers that sell the equipment in that subclass in 50 Hz and several voltage configurations. Equipment that cannot be purchased with the precise specifications needed must be purchased in U.S. specifications and then derated as described in Chapter 3.

## **Electrical Distribution and Protection**

Electrical distribution equipment includes transformers, panelboards and switchboards, generators, transfer switches, capacitors, and related equipment. Electrical protection devices include fuses, circuit breakers, relays, reclosers, and contactors. The devices have different sensitivities to supply voltage and frequency, and are discussed below.

### ***Electrical Distribution***

As mentioned earlier, transformers are sensitive to the frequency and amplitude of the supply voltage. Using a 60 Hz transformer in a 50 Hz electrical environment can cause the core of the transformer to saturate, overheating the transformer. Other than the potential problem with saturation, the transformer should be fully capable of supplying the nameplate rated load. Most transformers are available in 50 Hz or 50/60 Hz configurations, so saturation should not be a problem. Appendix B lists transformer types and vendors under the heading E11500.



Panelboards, switchboards, and load centers are generally not sensitive to supply frequency, except when protective devices such as circuit breakers are included in them. These items can be acquired readily in a wide variety of voltage ratings; therefore, supply voltage does not pose a problem. Appendix B lists switchboards under the heading E11200, switchboard instruments are listed under E11300, panelboards are listed under E11000, and load centers are listed under E10800.

General output voltage can be increased or decreased by using an appropriate transformer. However, since generators are typically used to supply backup power when the utility power source fails, and/or are used in addition to the utility power source, it is necessary for the generator to provide a 50 Hz voltage source to match the utility supply. Therefore the user must purchase a generator configured for 50 Hz operation. Appendix B lists several U.S. vendors that produce generators in 50 Hz configurations under E11820.

Automatic source transfer switches are sensitive to supply voltage frequency and amplitude because they are electronically controlled and have power supplies that expect to operate on 60 Hz and rated voltage. Once again, supply voltage level is not a problem since transformers are available to adapt voltage levels. Supply frequency, however, may be a problem depending on the type of power supply the electronics use. Appendix B lists vendors selling 50 Hz source transfer switches under the heading E11800.

Related equipment includes meter centers, and sockets or receptacles. Meter centers are sensitive to voltage level and frequency. Consequently, using a 60 Hz meter center in a 50 Hz environment may result in inaccurate readings. However, meters are readily available in a variety of voltage levels and 50 Hz configurations. Appendix B lists U.S. vendors under the heading E10900.

Sockets or receptacles are needed when foreign consumer products are to be used with the power system. Receptacles are configured for different voltage levels, and these configurations vary in different countries. It is important that the standard receptacle style for a given voltage be used to avoid confusing the user and creating a potential safety hazard. Appendix B lists U.S. vendors for receptacles under E10500.

Capacitors are used in an electrical distribution system to adjust the power factor or phase angle between the voltage and current waveforms. It is desirable to have a phase angle close to zero, or a power factor close to 1 so that most of the power transferred to the load is real power. Real power is the only part of the total kilovolt-amperes transferred that can do work. The balance is called reactive power

and cannot do any useful work. The operation of a capacitor depends on the supply frequency, since a capacitor's impedance,  $X_c$ , is related to the capacitance and frequency of the current passing through it by the equation  $X_c = 1/(j2\pi fC)$ , where  $C$  is the capacitance in farads and  $j$  equals the square root of -1. Appendix B lists capacitor vendors under the heading E11900.

### ***Electrical Protection***

Electrical protection devices vary in their sensitivity to supply frequency. All protection devices are available in a wide range of voltage ratings so the level of the supply voltage is not a concern. The main concern with protection devices is the change in response time from 60 Hz to 50 Hz. These devices are coordinated to protect the distribution system from faults (shorts or spikes) but are connected so they do not trip when anticipated voltage spikes (i.e., motor starting) occur. The power system design engineer must be sure to use the proper trip curves for the environment when coordinating protective devices. Trip curves for 50 Hz are readily available from vendors contacted in this study. The only device designed differently for 50 Hz and 60 Hz is the circuit breaker. Appendix B lists several produce circuit breakers with 50 Hz ratings under E11100. Appendix B lists vendors for other electrical protection equipment under the following headings: fuses listed under E10700, relays under E10460, conductors under E10450, and reclosers under E11840.

## **Medium Voltage Distribution Equipment: 50 Hz→60 Hz**

In this section medium voltage transformers, switchgear and associated auxiliary devices will be examined with respect to frequency and voltage changes.

### ***Medium Voltage Distribution Transformers***

Distribution transformers are key components in any electric power distribution system. It is important that they are properly matched to their environment. Issues related to operating a 60 Hz transformer from a 50 Hz power source were discussed earlier in this Technical Report. The emphasis here will be on discussing issues concerning operating 50 Hz transformers in a 60 Hz environment.

An important parameter to consider when operating a transformer, or other iron core-based devices, is the ratio of amplitude to frequency of the applied voltage. The ratio obtained using the nameplate rated voltage and frequency should be compared with the ratio available at the proposed site. If the ratio is less than or equal to that

obtained using the nameplate quantities, magnetic saturation will not be a problem at the new site. Any time the ratio is higher than nameplate, the manufacturer should be contacted to ensure that the transformer has enough reserve available to accommodate the increase in operating magnetic flux density.

For example, consider a transformer that is brought over from Germany where it was used on a 10kV, 50 Hz distribution system. It was determined that the electrical insulation system of the transformer was rated for 15kV. It is desired to use the transformer on a 13.8kV, 60 Hz system. Considering the magnetic circuit, the volts-per-hertz ratio of the 50 Hz transformer is 200 (i.e., 10kV/50 Hz). On the new supply the ratio would be increased to 230 (i.e., 13.8kV/60 Hz), requiring a higher magnetic flux density in the iron core. This increase could potentially saturate the iron core and overheat the transformer. Alternatively, this transformer could be used on a 7.2kV/60 Hz system (120 volts-per-hertz ratio), where saturation would not be a problem.

A few words should be mentioned concerning iron core loss in transformers. The two primary components of core loss are eddy-current loss and hysteresis loss. Eddy-current loss is the term used to describe the power loss associated with circulating currents that are found to exist in closed paths within the body of a iron material and cause undesirable heat production. Hysteresis loss represents the power loss associated with aligning and realigning the magnetic domains of iron in accordance with the changing magnetic flux. Both components are dependent on the frequency, as shown in the following equations:

$$P_{\text{eddy current}} = K_e f^2 B_m^2 \tau^2 v \quad [\text{Eq 6}]$$

$$P_{\text{hysteresis}} = K_h f B_m^2 v \quad [\text{Eq 7}]$$

where,

- $K$  = constant value dependent upon material
- $f$  = frequency of variation of flux
- $B$  = maximum flux density
- $v$  = total volume of the material
- $\tau$  = lamination thickness.

It should be noted that, even though frequency increases when using 50 Hz transformers on a 60 Hz-based system, the voltage-to-frequency ratio will typically be lower, and hence, the maximum flux densities  $B$  will be lower. The result is that core-losses will generally not increase as a result of the higher frequency used.

Other key parameters are voltage and current. To maintain insulation system integrity, rated voltage and/or current for the transformer should not be exceeded. A transformer can be operated on lower than rated voltage; however, its current rating must not be violated. Also, the secondary voltage must be matched to the proper voltage levels.

In addition to having an iron core, windings, and insulation system, distribution transformers may include tap changers and auxiliary devices. Auxiliary devices might include fans, current transformers, pressure relief devices, and lighting arresters. Once again, attention should be focused on devices that use a magnetic field for transferring or converting energy, such as instrument transformers and small motor drives. Even if the voltage-to-frequency ratio is found to be lower, manufacturers should be contacted to make sure that all linear and rotating drive mechanisms will develop adequate force and torque to function properly.

### ***Medium Voltage Switchgear***

Switchgear is a general term covering switching and interrupting devices alone, or their combination with other associated control, metering, protective, and regulating equipment. Common switchgear components include the power bus, power circuit breaker, instrument transformers, control power transformer, meters, control switches, protective relays and ventilation equipment. The ratings of switchgear assemblies are designations of the operational limits under specific conditions of ambient temperature, altitude, frequency, duty cycle, etc. For example, the performance of some 50 Hz magnetic type circuit breakers may be altered slightly when operated on a 60 Hz power system. Switchgear manufacturers should always be consulted to identify the frequency response of circuit breakers and all auxiliary devices.

## **Safety and Security Equipment**

Safety and security equipment includes fire detection systems, burglar alarm systems, doorbells, and surveillance systems. This equipment typically operates on low voltage, either alternating current (AC) or direct current (DC), generated initially by a power supply. Acquiring the proper power supply to convert from the supply voltage to the low voltage that these systems expect (typically 6 to 12 VAC or VDC) is the key to proper operation of these systems in foreign environments. Power supplies of 50 Hz/120VAC usually are available from vendors of these systems, and a transformer can be used to step a 240VAC supply down to a 120 VAC foreign environment. Therefore, derating is not necessary for these items, although

a transformer may be needed to step high voltage supply levels down to 120VAC for the power supplied to these systems.

Most vendors of safety and security equipment can configure their equipment to 50 Hz and a variety of voltage levels. Appendix B lists these vendors under the following headings: fire detection equipment under E12900, burglar alarm systems under E12400, doorbells under E12410, and surveillance systems under E12420.

## **Communication Equipment**

Communication equipment encompasses public address systems and sound systems, both of which operate on a low-voltage DC supply generated by a power supply. Power supplies are available to operate on 50 Hz and 240V supply voltages. In cases where only 120/50 Hz supplies are available, a step-down transformer can be used to step a 240V supply down to 120V. The vendors contacted in this study have stated that they provide 50 Hz power supplies. Appendix B lists these vendors under E12700.

## **Lighting**

Lighting can be divided into incandescent, fluorescent, and high intensity discharge (HID) categories. Incandescent lighting is not frequency-sensitive, whereas fluorescent and HID lights are started by a ballast that is sensitive to voltage level and frequency. All types of lighting are sensitive to the supply voltage level and cannot be derated for voltage. For example, subjecting a 120V incandescent lamp to a 240V source will result in the lamp burning twice as hot, causing rapid lamp failure. Subjecting the iron core ballast use in many HID and fluorescent fixtures to twice its rated voltage will saturate the ballast and will subject the fixture to much more than its rated current. As with transformers and motors, 60 Hz iron-core ballasts can also be saturated when operated at 50 Hz.

At first thought, frequency dependence may not be as much of a problem with electronic ballasts since, in most cases, the AC voltage source is first converted back to a high frequency AC source, and therefore, the voltage source that is actually impressed across the lamp is decoupled from the 60 Hz AC source. However, the power supply used to power the electronics in these ballasts must be capable of 50 Hz operation. Appendix B lists several vendors of 50 Hz and different voltage lighting equipment under E12000 and E12100.

## Other Electrical Equipment

Other electrical equipment includes motors, motor starters, computer power supplies, and clocks. An induction motor's dependence on frequency and voltage level was described in the section about HVAC equipment. Appendix B lists several vendors that produce motors rated at various voltage levels and 50 Hz under E11400.

Typically, motor starters are sensitive to both supply voltage level and frequency. The most commonly used motor starters consists of a coil, thermal overloads, and a set of contactors (contacts). The thermal overloads, which are essentially circuit breakers, and the contactors are rated to handle a certain amount of current. Since at 50 Hz, a motor of a given horsepower rating will draw more current than an identically-rated motor would draw at 60 Hz, the thermal overloads and the contactors must be sized accordingly. Appendix B lists vendors for motor starters under E 10600.

Computer power supplies include voltage regulators, isolation transformers, transient voltage suppressor transformers, computer regulator transformers, and power conditioning transformers. Computer power supplies are sensitive to both frequency and voltage level. Appendix B lists vendors from whom power supplies can be purchased in the appropriate 50 Hz configuration under E11700.

Clocks are sensitive to supply frequency and voltage. Clocks rely on the frequency of the supply voltage to keep correct time, so a clock designed for 60 Hz will not keep correct time at 50 Hz. Also, the motor that runs the clock is sensitive to supply voltage level for the reasons described above for motors. Therefore, a clock must either be purchased configured for the supply voltage level, or a transformer must be used to convert the supply voltage level to the clock's rated voltage level. Clocks cannot be derated for frequency, and therefore clocks designed for 50 Hz must be purchased. Appendix B lists vendors that produce clocks in 50 Hz configurations under E12300.

## 3 Equipment Derating

### Derating Under 50 Hz Conditions

Derating factors for 50 Hz operation are developed differently for different types of equipment. Derating factors for HVAC, electrical distribution and protection, safety and security equipment, communication equipment, lighting, and other electrical equipment will be discussed and derived where appropriate.

#### HVAC

The frequency of the supply voltage affects two types of components in HVAC systems: motors and controls. From the discussion in Chapter 2, for the same mechanical load and voltage level, a 60 Hz motor will draw 20 percent more current when supplied from a 50 Hz voltage source (assuming the iron core of the motor does not saturate). Therefore, a 60 Hz motor would have to be capable of handling the increase in current level. However, as was also mentioned in the previous chapter, saturation can be a serious problem when running a 60 Hz motor off a supply frequency of 50 Hz. Developing a derating factor to account for saturation is not possible, since the motor designs vary from vendor to vendor, and hence, the degree of saturation that would occur, if any, would be impossible to predict. Consequently, it is recommended that no horsepower derating be performed, and a 50 Hz motor be purchased.

However, if the vendor can guarantee the user that a given 60 Hz motor would not saturate at 50 Hz, then the motor would need only to be derated to handle the 20 percent increase in current level. The amount of horsepower derating required would depend on the motor's mechanical load, service factor, and thermal limit. The service factor is a measure of how much the motor can be overloaded continuously without exceeding safe temperature limits. The thermal limit is the minimum speed at which an AC motor can be operated with rated amperes, without exceeding safe temperature rise. The thermal limit is important because the motor's ability to cool itself will be reduced at lower speeds unless, of course, some sort of auxiliary cooling is used. In most cases, however, the minimum shaft speed necessary to exceed the thermal limit is much lower than 1500 revolutions per minute (RPM, e.g., for a 4-

pole motor), so 50 Hz operation should not be a problem, although the vendor should be contacted for verification. A 60 Hz motor with a 1.20 service factor can be operated safely while overloaded continuously by 20 percent. The same motor can be operated safely with a rated mechanical load and a 50 Hz power supply with no horsepower derating, assuming saturation is not an issue, the thermal limit of the motor is not exceeded, and the same voltage amplitude is applied. However, a 60 Hz motor, with a 1.0 service factor, driving a rated mechanical load would have to be derated for horsepower by 20 percent, since it is not capable of handling greater than the rated current. In summary, the user should find out the service factor and thermal limit of the motor to determine the amount of horsepower derating required, and to ensure that the 20 percent increase in current level in the motor does not exceed the motor's rating (again, assuming saturation is not a concern).

Another issue to be considered when purchasing HVAC equipment for a 50 Hz environment is that the motor's shaft will spin  $5/6$  as fast as it would with a 60 Hz supply. For a 4-pole motor, the shaft will rotate at roughly 1500 RPM when run off a 50 Hz supply, whereas with a 60 Hz voltage source it will rotate at about 1800 RPM. Consequently, equipment that is directly coupled to the shaft of the motor will rotate at  $5/6$  the speed it would in a 60 Hz environment. Hence, direct-drive equipment must be derated to account for the change in speed. In cases where the equipment is indirectly coupled to the motor shaft, through the use of adjustable pulleys for example, the reduction in shaft speed is not as much of a problem since the required speed of rotation can be obtained through the proper adjustment or selection of the pulleys.

Additionally, electronic HVAC controls that contain their own power supply may be 50 Hz sensitive. Most of the vendors contacted stated that this typically is not a problem because most controls are frequency-sensitive. If the control are 50 Hz sensitive, they must be purchased in a 50 Hz configuration. The HVAC vendor must be consulted on a case-by-case basis to determine if the controls can be used in 50 Hz environments.

## **Electrical Distribution and Protection**

In general, a 60 Hz transformer should not be used with a 50 Hz voltage source because of the potential saturation problem. As with motors, a derating factor cannot be developed to account for saturation because of the many different transformer designs on the market. It is recommended that a 50 Hz transformer be purchased for use with a 50 Hz voltage source. However, if a 60 Hz transformer vendor can ensure that a transformer will not saturate when operated at 50 Hz, the



transformer should be fully capable of safely supplying its nameplate rate load (i.e., no horsepower derating is required). In terms of the transformer's equivalent impedance, sometimes used for power system studies (e.g., short-circuit and load-flow analysis), the 60 Hz value should be derated by 5/6 to account for the reduction in system frequency.

Power factor capacitors rate at 60 Hz must also be derated to 50 Hz. Capacitors do not consume any real power, but they do consume reactive power. The rating given to power factor capacitors is given in units of Kilovolt-amperes reactive (KVAR), which indicates the amount of reactive power the capacitor will consume at the rated frequency. As mentioned in Chapter 2, the capacitor's impedance,  $X_c$ , is inversely related to frequency. If the frequency drops from 60 to 50 Hz, the impedance will increase to 6/5 of its 50 Hz value. Since the KVAR rating equals  $V^2/X_c$ , if  $X_c$  at 50 Hz increases to 6/5 of its 60 Hz rating, the KVAR rating will decrease to 5/6 of its 60 Hz rating when the capacitor is used in a 50 Hz environment. Therefore, a 60 Hz-rated capacitor must have the KVAR rating multiplied by 5/6 to yield its 50 Hz KVAR rating.

Other electrical protection and distribution equipment either cannot or should not be derated. Electrical protection devices are generally able to be used at either 50 Hz or 60 Hz, but a different trip curve needs to be used by the power system designer for 50 Hz. These 50 Hz trip curves are readily available from vendors of this equipment, so no derating is necessary. The only exception is that some circuit breakers are designed differently at 50 Hz and 60 Hz. Appendix B lists several vendors that produce circuit breakers at 50 Hz and 60 Hz.

Voltage, current, and power meters can be derated, but this practice is not recommended. A meter should display the true value it is supposed to measure to ensure that the readings are interpreted correctly and that no dangerous situations result. Meters, therefore, should not be derated. Automatic transfer switches use power supplies that may or may not be frequency-sensitive. Vendors must be contacted regarding 50 Hz configuration of these devices. Electrical generators must be purchased already configured to provide a 50 Hz voltage source. Appendix B lists several vendors that produce the equipment in 50 Hz configurations for each type of electrical distribution equipment.

## Safety and Security Equipment

Safety and security equipment operate on a low-voltage AC or DC source that is generated by a power supply. Some power supplies are sensitive to frequency;

others are not. In either case, derating is not necessary since power supplies sensitive to frequency cannot be derated, and power supplies insensitive to frequency do not need to be derated. In cases where the power supplies are sensitive to 50 Hz, vendors are able to ship the equipment with a 50 Hz-compatible power supply. Appendix B lists vendors for safety and security equipment.

## **Communication Equipment**

Communication equipment operates on a low-voltage DC supply and does not need to be derated for frequency. Vendors will either ship the units with frequency-insensitive power supplies, or they will configure the units for 50 Hz operation before shipping. Appendix B lists vendors for communications equipment.

## **Lighting**

Incandescent lighting is not frequency-sensitive since this type of lighting consists of a resistive element (the filament), which is not frequency-sensitive. Fluorescent and HID lighting, on the other hand, use a ballast to generate the proper lamp voltage and to limit the current flowing through the lamp. These ballasts are sensitive to frequency. Because of the numerous ballast designs and styles on the market, and the potential saturation problem, a simple derating factor cannot be developed and it is recommended that a vendor supplying 50 Hz-rated ballasts be located from the listing of vendors in Appendix B.

## **Other Electrical Equipment**

Other electrical equipment consists of motors, motor starters, computer power supplies, and clocks. Motor derating was mentioned earlier in the HVAC section of this chapter. Motor starters are sensitive to frequency as well, but indirectly so. Since a 60 Hz motor will draw 20 percent more current when operated off a 50 Hz voltage source, assuming the same voltage amplitude is applied and there is no saturation problem, the motor starter current rating must be derated by 20 percent to account for the increase in current.

Clocks and computer supply equipment are sensitive to frequency and cannot be derated. Clocks rely on the frequency of the supply to keep correct time, so a 60 Hz clock will not keep correct time at 50 Hz. Although derating factors could be developed for clocks, they would be meaningless. Computer power supply

equipment cannot be derated due to the way the equipment is constructed. Appendix B lists vendors who supply clocks and computer supply equipment configured for 50 Hz operation.

### **Derating Under Alternate Voltage Conditions**

As Appendix A shows, standard one-phase voltages around the world are either in the range of 100-127VAC or 220-240 VAC. Voltage variations within about 10 percent of an equipment's rated voltage are acceptable, so derating for voltage will only be necessary when a piece of equipment rated for U.S. voltage (approximately 115VAC) needs to be operated in an environment using 220-240VAC. This would be a doubling of rated voltage. None of the equipment sensitive to voltage level is capable of surviving this increase without rapid failure. Thus, no derating factors for voltage level are offered. Instead, it is recommended that transformers be used to step the higher voltage level down to a voltage level in the range of 100-127VAC, which U.S. equipment can tolerate. Appendix B lists vendors from whom these transformers are readily under the heading E11500 - Transformers. It has been found, however, that most vendors of voltage-sensitive equipment are able to configure the equipment for 220-240VAC and corresponding three-phase voltage levels. Appendix B lists these vendors are listed under the appropriate headings. Appendix D lists the vendors alphabetically. Appendix E contains summary tables organized by equipment numbers, that contain available voltage levels, derating capability and method, and vendors for each type of equipment.

## 4 Summary and Recommendations

Appendix A of this report lists electric standards by country. This listing can be used to rapidly identify the standard frequency and voltage levels in other countries. In cases where cities within a country differ in their electrical standards, the cities are listed separately. For countries in which all cities have the same electrical standards, typically only the capital city is listed. In these cases, assume that all cities in the country have the same electrical standards.

This research identified six types of equipment sensitive to 50 Hz: heating, ventilation, and air-conditioning; electrical distribution and protection; safety and security; communication; lighting; and other electrical equipment (e.g., motors, starters, clocks). Appendix B lists this equipment, by class and subclass, and includes the names of U.S. manufacturers/vendors who produce the equipment configured to operate using foreign electrical standards.

Derating factors were discussed and developed for the six generic types of equipment. Appendix C, which summarizes the discussion of derating factors presented in Chapter 3, is useful in identifying derating factors quickly and easily.

This research also yielded a comprehensive list of the U.S. manufacturers and vendors of 50 Hz-sensitive equipment. Appendix D contains this list. Appendix E contains summary tables that complete the information gathered during this research.

Although Chapter 3 presented derating factors for equipment, it is recommended that, whenever a piece of equipment is to be derated, the vendor be contacted to discuss the derating. It is always preferable to locate a vendor that will supply the equipment with the desired ratings before derating is attempted. The majority of vendors contacted are able to supply equipment rated at 50 Hz and a variety of voltage levels, so derating should be necessary in only a few cases.

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## Appendix A: Frequency and Single- and Three-Phase Voltage Levels by Country

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Afghanistan	50	1,3	220/380	3.2, 6, 10, 15, 20
Algeria	50	1,3	127/220 220/380	5.5, 6.6, 10, 30
American Samoa	60	1,3	120/240 240/480	NA
Angola	50	1,3	220/380	NA
Antigua	60	1,3	230/400	N A
Argentina	50	1,3	220/380	6.6, 13.2, 33
Australia	50	1,3	240/415	6.6, 7.6, 11, 12.7, 19, 22, 33, 66
Austria	50	1,3	220/380	3, 5, 6, 10, 20, 25, 28, 30
Azores				NA
Ponta Delgada	50	1,3	110/190 220/380	
All Others	50	1,3	220/380	
Bahamas	60	1,3	120/240 120/208	7.2, 11
Bahrain				11
Awali	60	1,3	230/400	
All Others	50	1,3	230/400	
Bangladesh	50	1,3	220/380	11, 33 (varies season- ally)
Barbados	50	1,3	115/230 115/200	11, 24

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Belgium				6.6, 10, 15, 36, 70*
Anderlecht	50	1,3	220	
Antwerpen	50	1,3	127/220 220/380	
Brugge	50	1,3	220/380	
Brussels	50	1,3	127/220 220/380	
Charlerio	50	1,3	230/400	
Gentbrugge	50	1,3	220/380	
Hasselt	50	1,3	130/220 220/380	
Hoboken	50	1,3	127/220 220/380	
Huy	50	1,3	220	
Jette	50	1,3	127/220	
Leige	50	1,3	220/380	
Liege- Monsinport	50	1,3	110/220 220/380	
Lokeren	50	1,3	220/380	
Leuven	50	1,3	220/380	
Mechelen	50	1,3	220/380	
Mons	50	1,3	220/380	
Namur	50	1,3	220/380	
Oostende	50	1,3	127/220 220/380	
Ronse	50	1,3	220/380	
Seraing	50	1,3	220/280	
Turnhout	50	1,3	220	
Uccle	50	1,3	220/380	
Vilvoorde	50	1,3	120/220 220/380	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Belize				6.6, 22*
Belize City	60	1,3	110/220 220/440	
Balmopan	60	1,3	110/220 220/240	
Corozal Town	60	1,3	110/220 220/440	
Orange Walk	60	1	110/220	
San Ignacio	60	1	110/220	
Stann Creek	60	1	110/220	
Punta Gorda	60	1,3	110/220 220/440	
San Pedro	60	1	110/220	
Benin	50	1,3	220/380	15, 20
Bermuda (Island-wide)	60	1,3	120/240 120/208	NA
Bolivia				6.6, 24.9*
Calamarca	50	1,3	230/400	
Challapata	50	1,3	220/380	
Cobija	50	1,3	230/400	
Cochabamba	50	1,3	220/380	
Guayaramerin	50	1,3	230/400	
La Paz	50	1,3	???/230	
Potosi	50	1,3	220/380	
Oruro	50	1,3	110/220	
Riberalta	50	1,3	230/400	
Santa Cruz	50	1,3	220/380	
Sucre	50	1,3	220/380	
Trinidad	50	1,3	230/400	
Tupiza	50	1,3	220/380	
Viacha	50	1,3	110/220	
Villazon	50	1,3	220/380	
Bosnia/ Herzegovina	NA	NA	NA	6.6, 10
Botswana	50	1,3	220/380	11, 33, 66

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.



Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Brazil				6, 11.4, 13.8, 22, 25, 34.5*
Barbacena	60	1,3	110/220	
Blumenau	60	1,3	220	
Braganca	60	1,3	110/220	
Brasilia	60	1,3	220/380	
Caxias do Sul	60	1,3	220/380	
Cel Fabriciano	60	1,3	110/220	
Corumba	60	1,3	110/220	
Florianopolis	60	1,3	220/380	
Fortaleza	60	1,3	230/400	
Goiania	60	1,3	220/380	
Goiias	60	1,3	220/380	
Itajai	60	1,3	220	
Joao Pessoa	60	1,3	220	
Joinville	60	1,3	220/380	
Jundiai	60	1,3	110	
Livramento	60	1,3	220/380	
Londrina	60	1,3	127/220	
			110/220	
Macapa	60	1,3	110/220	
Maceio	60	1,3	220/380	
Manaus	60	1,3	120/240	
Mossoro	60	1,3	220/380	
Natal	60	1,3	220/380	
Nova Friburgo	60	1,3	220	
Olinda	60	1,3	127/220	
			220/380	
Paranagua	60	1,3	110/220	
Parnaiba	60	1,3	110/220	
Pelotas	60	1,3	220/380	
Petropolis	60	1,3	127/220	
			115/220	
Ponto Grossa	60	1,3	220	
Porto Velho	60	1,3	110/220	
Santo Andre	60	1,3	115/230	
Sao Bernaroo do				
Campo	60	1,3	115/230	
Sao Caetano do Sul	60	1,3	110/220	
Sao Luis	60	1,3	110/220	
Sao Paulo	60	1,3	115/230	
Teresina	60	1,3	110/220	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Brunai	NA	NA	NA	11, 68
Bulgaria	50	1,3	220/380	NA
Burma/Myanmar	50	1,3	230/400	3.3, 6.6, 11, 33
Burundi	50	1,3	220/380	6.6, 15
Cambodia				4.4, 6.3, 15*
Phnom-Penh	50	1,3	220/380	
Sihanoukville	50	1,3	220/380	
All Others	50	1,3	120/208	
Cameroon				10, 15, 30, 33, 55*
Buea	50	1,3	230/400	
Eseka	50	1,3	127/220	
Maroua	50	1,3	127/220	
Mbalmayo	50	1,3	127/220	
			220/380	
Nkongsamba	50	1,3	127/220	
			220/380	
Sangmelima	50	1,3	127/220	
			220/380	
Victoria	50	1,3	230/400	
Yaounde	50	1,3	127/220	
			220/380	
All Others	50	1,3	220/380	
Canada	60	1,3	120/240	2.4, 4.16, 7.2, 8, 12.47, 13.8, 14.4, 20, 25, 34.5, 44, 49
Canary Islands	50	1,3	127/220 220/380	NA
Cape Verde (Praia)	50	1,3	220/380	6, 6.3, 13, 15, 20
Cayman Islands	60	1,3	120/240	NA
Central African Republic				NA
	50	1,3	220/380	
Chad	50	1,3	220/380	15
Channel Islands				11
Alderney	50	1,3	240/415	
Guernsey	50	1,3	230/400	
Jersey	50	1,3	240/415	
Chile	50	1,3	220/380	12, 13.2, 13.8, 15, 23

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
China	50	1,3	220/380	10, 20, 35
Colombia				4.16, 7.6, 13.2, 13.8, 33, 34.5, 44*
Bogata	60	1,3	150/240	
Duitama	60	1,3	120/208	
Honda	60	1,3	120/208	
Sogomosa	60	1,3	120/240	
All Others	60	1,3	110/220	
Congo	50	1,3	220/380	5.5, 6.6, 10, 20
Costa Rica	50	1,3	120/240	4.2, 13.2, 24.9, 34.5
Croatia	50	1,3	220/380	10, 35
Cyprus	50	1,3	240/415	11
Czech Republic	50	1,3	220/380	6, 10 (urban) 22, 35 (rural)
Denmark	50	1,3	220/380	6, 10, 20, 30
Djibouti	50	1,3	220/380	NA
Dominican Republic	60	1,3	110/220	2.5, 4.16, 12.5

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Ecuador				13.8, 34.5, 46, 69*
Cuenca	60	1,3	120/208	
Esmeraldas	60	1,3	120/208	
			120/240	
Guaranda	60	1,3	120/208	
			120/240	
Ibarra	60	1,3	127/220	
Latacunga	60	1,3	120/208	
Loja	60	1,3	127/220	
Machala	60	1,3	127/220	
Morona	60	1,3	120/208	
Portoviejo	60	1,3	127/220	
Puyo	60	1,3	127/220	
Quito	60	1,3	120/208	
			127/220	
Riobamba	60	1,3	110/220	
Tulcan	60	1,3	121/210	
			127/220	
Zamora	60	1,3	121/210	
			127/220	
All Others			120/208	
			127/220	
Egypt	50	1,3	220/380	3, 6.6, 11, 20, 33, 66
El Salvador	60	1,3	115/230	4.16, 4.4, 13.2, 23, 34.5
England (see United Kingdom)				
Equatorial Guinea	50	1	220	NA
Ethiopia	50	1,3	220/380	15
Faroe Islands	50	1,3	220/380	NA
Fiji	50	1,3	240/415	11
Finland	50	1,3	220/380	10, 20, 30, 45

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
France				3.3, 5.5, 10, 15, 20, 30*
l'Alpe d'Huez	50	1,3	127/220 220/380	
Alencon	50	1,3	127/220 220/380	
Amiens	50	1,3	115/220 220/380	
Angers	50	1,3	127/220 220/380	
Angouleme	50	1,3	127/220 220/380	
Annecy	50	1,3	127/220 220/380	
Arcachon	50	1,3	127/220 220/380	
Argenteuil	50	1,3	127/220 220/380	
Asnieres	50	1,3	115/200 220/380	
LaBaule	50	1,3	127/220 220/380	
Besancon	50	1,3	127/220 220/380	
Beziers	50	1,3	127/220 220/380	
Biarritz	50	1,3	127/220 220/380	
Boulogne-sur-Mer	50	1,3	127/220 220/380	
la Bourboule	50	1,3	127/220 220/380	
Bourges	50	1,3	127/220 220/380	
Bourg-En-Bresse	50	1,3	127/220 220/380	
Brest	50	1,3	127/220 220/380	
Briancon	50	1,3	115/200	
Cabourg	50	1,3	127/220 220/380	
Caen	50	1,3	127/220	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
France (cont'd)				
Calais	50	1,3	115/220 220/380	
Cauterets	50	1,3	127/220	
Chalons	50	1,3	127/220 220/380	
Chateauroux	50	1,3	120/208 220/380	
Chaumont	50	1,3	120/208 220/380	
Cherbourg	50	1,3	127/220 220/308	
Chinon	50	1,3	127/220 220/308	
Clermont-Ferrand	50	1,3	127/220 220/308	
Collioure	50	1,3	127/220 220/380	
Courbevoie	50	1,3	115/230	
Deauville	50	1,3	127/220 220/380	
Dieppe	50	1,3	127/220 220/380	
Dijon	50	1,3	127/220 220/380	
Dinan	50	1,3	127/220 220/380	
Douai	50	1,3	127/220 220/380	
Dreux	50	1,3	127/220 220/380	
Etain	50	1,3	115/200 220/380	
Evreux	50	1,3	127/220	
Fontainbleau	50	1,3	127/220 220/380	
Frejus	50	1,3	127/220 220/380	
Grenoble	50	1,3	127/220	
LeHavre	50	1,3	110/190 127/220 220/380	

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Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
France (cont'd)				
Jouge	50	1,3	127/220 220/380	
Juan-les-Pins	50	1,3	127/220	
Lens	50	1,3	127/220 220/380	
Lille	50	1,3	110/220 220/380	
Luchon	50	1,3	127/220 220/380	
Luxeuil-Bains	50	1,3	127/220 220/380	
Lyon	50	1,3	110/220 127/220 220/380	
LeMans	50	1,3	127/220 220/380	
Marly-le-Roi	50	1,3	127/220 220/380	
Marseille	50	1,3	115/200 220/380	
Megev	50	1,3	127/220	
Metz	50	1,3	110/190 220/380	
Lemont-Dore	50	1,3	127/220 220/380	
Motlucon	50	1,3	127/220 220/380	
Morzine	50	1,3	127/220 220/380	
Mulhouse	50	1,3	230 220/380	
Nancy	50	1,3	127/220 220/380	
Nantes	50	1,3	110/190	
Neuilly	50	1,3	115/230 127/220 220/380	
Nice	50	1,3	127/220	
Nimes	50	1,3	220 220/380	
Orleans	50	1,3	127/220	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
France (cont'd)				
Perpignan	50	1,3	127/220 220/380	
Roanne	50	1,3	127/220 220/380	
LaRochelle	50	1,3	115/200 127/220 220/380	
Roubaix	50	1,3	220/380	
Royan	50	1,3	127/220 220/380	
Saint-Etienne	50	1,3	115/230 127/220 220/380	
Saint-Gervais-Les-Bains	50	1,3	127/220 220/380	
Saint-Jean-de-Lux	50	1,3	380	
Saint Lo	50	1,3	127/220 220/380	
Saint Quentin	50	1,3	127/220 220/380	
Sallanches	50	1,3	127/220	
Strasbourg	50	1,3	125/220 220/380	
Tabes	50	1,3	115/200 220/380	
Toulon	50	1,3	127/220 220/380	
Tourcoing	50	1,3	110/220 220/380	
Tours	50	1,3	127/220	
Val d' Isere	50	1,3	127/220 220/380	
Valenciennes	50	1,3	127/220 220/380	
Valloire	50	1,3	127/220	
Verdun	50	1,3	127/220 220/380	
Versailles	50	1,3	127/220 220/380	
Vichy	50	1,3	127/220	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.



Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Vincennes	50	1,3	127/220 220/380	
All Others	50	1,3	220/380	
French Guiana	50	1,3	220/380	NA
Gabon	50	1,3	220/380	5.5, 20
Gambia	50	1,3	220/380	11, 33
Germany	50	1,3	220/380	3, 6, 10, 20, 30, 45, 60
Ghana	50	1,3	220/400	11, 33, 34.5
Gibraltar	50	1,3	240/415	NA
Greece	50	1,3	220/380	6.6, 15, 20, 22
Greenland	50	1,3	220/380	NA
Grenada	50	1,3	230/400	NA
Guadeloupe	50	1,3	220/380	20
Guam	60	1,3	110/220 120/208	4, 13.8
Guatemala	60	1,3	120/240	22, 34.5, 50
Guinea	50	1,3	220/380	5.5, 6.3, 15, 20, 30
Guinea-Bissau	50	1,3	220/380	6, 10, 20, 30
Guyana	50	1,3	110/220	2.3, 4, 11, 13.8
Haiti				2.4, 4.2, 7.2, 12.5*
Cap Haitien	60	1,3	120/208	
Gonaives	60	1,3	120/208	
All Others	50	1,3	110/220	
Honduras	60	1,3	110/220	2.4, 4.2, 13.8, 34.5, 69
Hong Kong	50	1,3	200/346	11, 33
Hungary	50	1,3	220/380	6, 10, 20, 22, 30, 35
Iceland	50	1,3	220/380	6, 11, 22, 33

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
India				2.2, 3.3, 6.6, 11, 15 11*
Bombay City	50	1,3	230/400 230/460	
Madras	50	1,3	230/400 250/440	
Mussoorie	50	1,3	220/380	
Naini Tal	50	1,3	220/380	11
New Delhi	50	1,3	230/400 230/415	
Patna	50	1,3	220/380	
Simla	50	1,3	220/380	
All Others	50	1,3	230/400	
Indonesia				3-20*
Jakarta	50	1,3	220/380	
All Others	50	1,3	127/200	
Iran	50	1,3	220/380	11, 20, 33, 63, 66
Iraq	50	1,3	220/380	6.6, 11
Ireland	50	1,3	220/380	5, 10, 20, 38
Isle of Man	50	1,3	240/415	NA
Israel	50	1,3	230/400	6.3, 12.6, 22, 33*
Jerusalem	50	1,3	220/380	
Italy	50	1,3	127/220 220/380	3.6, 10, 15, 20, 30, 45, 66
Ivory Coast	50	1,3	220/380	NA
Jamaica	50	1,3	110/220	6.9, 13.8, 24

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Japan				3, 6, 6.6, 11, 20, 22, 60*
Chiba	50	1,3	100/200	
Hakodate	50	1,3	100/200	
Kawasaki	50	1,3	100/200	
Muroran	50	1,3	100/200	
Niigata	50	1,3	100/200	
Otaru	50	1,3	100/200	
Sapporo	50	1,3	100/200	
Sendai	50	1,3	100/200	
Tokyo	50	1,3	100/200	
Yokohama	50	1,3	100/200	
Yokosuka	50	1,3	100/200	
All Others	60	1,3	100/200	
Jordan	50	1,3	220/380	6.6, 11, 33
Kenya	50	1,3	240/415	11, 33, 40, 66
Korea	60	1,3	100/200	22.9 (South)
	60	1	105/210	
	60	1,3	220/380	
Kuwait	50	1,3	240/415	NA
Laos	50	1,3	220/380	6.6, 22
Lebanon				11, 15, 33*
Tripoli	50	1,3	110/190 220/380	
Zahleh	50	1,3	220/380	
All Other	50	1,3	110/190	
Lesotho	50	1,3	120/240 120/208	11, 33
Liberia	60	1,3	120/240 120/208	7.2, 12.5
Libya				NA
Barce	50	1,3	230/400	
Benghazi	50	1,3	230/400	
Darnah	50	1,3	230/400	
Al Bayda	50	1,3	230	
Sebha	50	1	230	
Tubruq	50	1,3	230/400	
All Other	50	1,3	127/220	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Luxembourg	50	1,3	120/208 220/380	5, 15, 20, 65
Macau	50	1,3	220/380	11
Macedonia	NA	NA	NA	6.6, 10
Madagascar				5, 20, 35*
Ambatolampy	50	1,3	220/380	
Ambatondrazaka	50	1,3	220/380	
Tulear	50	1,3	220/380	
All Others	50	1,3	127/220 220/380	
Majorca Island	50	1,3	127/220 220/380	NA
Malawi	50	1,3	230/400	3.3, 11, 33, 66
Malaysia	50	1,3	240/415	6.6, 11, 22, 33
Maldives	50	1,3	230/400	11
Mali, Republic of	50	1,3	220/380	15, 30
Malta	50	1,3	240/415	6, 11
Martinique	50	1,3	220	NA
Mauritius	50	1,3	230/400	6.5, 22
Mexico	60	1,3	127/220	6.6, 13.2, 13.8, 23, 34.5, 44, 69
Monaco	50	1,3	127/220 220/380	10, 20
Montserrat	60	1,3	230/400	NA

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Morocco				5.5, 20, 22*
Agadir	50	1,3	127/220 220/380	
Beni-Mellal	50	1,3	127/220 220/380	
El-Hoceima	50	1,3	220/380	
Khemisset	50	1,3	220/380	
Khenifra	50	1,3	220/380	
Oued-Zem	50	1,3	127/220 220/380	
Sidi Kacem	50	1,3	127/220 220/380	
Sidi Slimane	50	1,3	127/220 220/380	
Souk-El-Arba Gharb	50	1,3	127/220 220/380	
All Others	50	1,3	127/220	
Mozambique	50	1,3	220/380	6.6, 11, 22, 33
Myanmar/Burma	50	1,3	230/400	3.3, 6.6, 11, 33
Nepal	50	1,3	220/440	11, 33
Netherlands				5.3, 6, 10, 12.5, 20, 25*
Amsterdam	50	1,3	220/380 220	
Delft	50	1,3	220/380 220	
All Others	50	1,3	220/380	
Netherlands Antilles				NA
Aruba:				
Lago Colony	60	1	115/230	
Oranjestad	60	1,3	127/220	
San Nicolas	60	1,3	127/220	
Bonaire:				
Kralendijk	50	1,3	127/220	
Curacao:				
Emmastad	50	1,3	223/380	
Willemstad	50	1,3	127/220	
St. Martin:				
Philipsburg	60	1,3	120/208	
New Caledonia	50	1,3	220/380	NA

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
New Zealand	50	1,3	230/400	11
Nicaragua	60	1,3	120/240	13.8, 24.9
Niger	50	1,3	220/380	5.5, 15, 20
Nigeria	50	1,3	230/415	11, 33
Norway	50	1,3	230	NA
Okinawa				NA
Military Facilities	60	1	120/240	
All Cities	60	1	100/200	
Oman	50	1,3	240/415	11, 33
Pakistan				11, 33
Hyderabad	50	1,3	220/380	
Karachi	50	1,3	220/380	
All Others	50	1,3	230/400	
Panama				11, 12, 34.5*
Colon	60	1,3	115/230	
Panama City	60	1,3	115/230 126/208	
Puerto Armuelles	60	1,3	120/240	
All Others	60	1,3	110/220	
Papua New Guinea	50	1,3	240/415	11, 22
Paraguay	50	1,3	220/380	23
Peru				5, 10, 20, 30*
Arequipa	50	1,3	220	
Talara	60	1,3	110/220	
All Others	60	1,3	220	
Philippines				2.4, 4.8, 6.24, 7.62, 13.2, 13.8, 34.5*
Manila	60	1,3	115/230 110/220	
All Others	60	1,3	110/220	
Poland	50	1,3	220/380	6, 15, 20, 30, 40, 60
Portugal	50	1,3	220/380	6, 10, 15, 30, 40, 60
Puerto Rico	60	1,3	120/240	4.16, 13.2
Qatar	50	1,3	240/415	11
Romania	50	1,3	220/380	6, 10, 20

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Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Russia	50	1,3	220/380	NA
Rwanda	50	1,3	220/380	6.6, 15, 30
St. Kitts and Nevis	60	1,3	230/400	NA
St. Lucia	50	1,3	240/416	11
San Marino	NA	NA	NA	15
St. Vincent	50	1,3	230/400	6.3, 11, 33
Saudi Arabia				13.8, 33, 34.5, 69*
Al Khobar	60	1,3	127/220	
Buraydah	50	1,3	220/380	
Dammam	60	1,3	127/220	
Hufuf	50	1,3	230/400	
Jiddah	60	1,3	127/220	
Mecca	50	1,3	230/400	
Medina	60	1,3	127/220	
Riyadh	60	1,3	127/220	
Taif	50	1,3	230/400	
Senegal	50	1,3	127/20	5.5, 16.6, 30
Serbia	50	1,3	220/380	10, 20, 35
Seychelles	50	1,3	240	11
Sierra Leone	50	1,3	230/400	11
Singapore	50	1,3	230/400	6.6, 22
Slova Republic	NA	NA	NA	6, 10, 22, 35
Slovenia	NA	NA	NA	6.6, 10
Somalia				3, 15*
Berbera	50	1,3	230	
Brava	50	1,3	220/440	
Chisimaio	50	1,3	220	
Hargeysa	50	1,3	220	
Marka	50	1,3	120/220	
Mogadishu	50	1,3	220/380	

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Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
South Africa/Namibia				6.6 , 11 , 22 , 33*
Beaufort West	50	1,3	230/400	
Benoni	50	1,3	230/400	
Boksburg	50	1,3	230/400	
Cradock	50	1,3	230/400	
Germiston	50	1,3	230/400	
Grahaamstad	50	1,3	250/430	
Keetmanshoop	50	1,3	230/400	
King Williams	50	1,3	220/380	
			250/433	
Klerksdorp	50	1,3	230/400	
Kroonstad	50	1,3	230/400	
Paarl	50	1,3	230/400	
Port Elizabeth	50	1,3	250/433	
Pretoria	50	1,3	240/415	
Roodepoort	50	1,3	230/400	
Somerset West	50	1,3	230/400	
Springs	50	1,3	220/380	
			230/400	
Stellenbosch	50	3	220/380	
Umtata	50	1,3	230/400	
Upington	50	1,3	230/400	
Virginia	50	1,3	230/400	
Vryheid	50	1,3	230/400	
Walvis Bay	50	1,3	230/400	
Wellington	50	1,3	230/400	
Worcester	50	1,3	230/400	
All Others	50	1,3	220/380	
Spain	50	1,3	127/220 220/380	3, 6.6, 10, 11.6, 15, 20, 33
Sri Lanka	50	1,3	230/400	11, 33
Sudan	50	1,3	240/415	11, 33
Suriname	60	1,3	115/230	33
Swaziland	50	1,3	230/400	11, 33
Sweden	50	1,3	220/380	3, 6, 7, 10, 20, 30
Switzerland	50	1,3	220/380	1, 16, 50
Syria	50	1,3	220/380	20
Tahiti	60	1,3	127/220	4.8, 14.4, 20

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Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Taiwan	60	1,3	110/220	2.3, 3.3, 5.9, 11.4, 22.8
Tanzania	50	1,3	230/400	11, 33
Thailand	50	1,3	220/380	3.5, 11, 12, 22, 24, 33
Togo				5.5, 20, 33*
Lome	50	1,3	127/220 220/380	
All Others	50	1,3	220/380	
Tonga	50	1,3	240/415	11
Trinidad and Tobago	60	1,3	115/230 230/400	6.6, 12
Tunisia				10, 15, 30*
Ariana	50	1,3	127/220 220/380	
Bardo	50	1,3	127/220 220/380	
Beja	50	1,3	127/220	
Bizerte	50	1,3	127/220	
Carthage	50	1,3	127/220	
Gafsa	50	1,3	127/220 220/380	
Hammam-Lif	50	1,3	127/220	
Kairouan	50	1,3	127/220	
La Goulette	50	1,3	127/220	
La Manouba	50	1,3	127/220	
La Marsa	50	1,3	127/220	
Mateur	50	1,3	127/220	
Menzel Bourguiba	50	1,3	127/220	
Sfax	50	1,3	127/220 220/380	
Sousse	50	1,3	127/220	
Tunis	50	1,3	127/220 220/380	
All Others	50	1,3	220/380	
Turkey				6.3, 10.5, 15, 34.5*
Istanbul	50	1,3	110/220 220/380	
All Others	50	1,3	220/380	
Uganda	50	1,3	240/415	11, 33

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
United Arab Emirates				6,6, 11, 33*
Abu Dhabi	50	1,3	240/415	
Ajman	50	1,3	230/400	
Dubai	50	1,3	220/380	
United Kingdom:				
England	50	1 3	240/480 240/415	3.5, 6.6, 11, 22, 33, 66
Scotland	50	1,3	240/415	6.6, 11, 22, 33
Northern Ireland	50	1,3	220/380 230/400	6.6, 11, 33
United States of America	60	1,3	120/240 120/208	2.4, 4.16, 4.8, 6.9, 8.32, 12, 12.47, 13.2, 13.8, 14.4, 19.9, 20.8, 22.86, 23, 24.94, 34.5, 46, 69
Upper Volta	50	1,3	220/380	NA
Uruguay	50	1,3	220	6, 15, 30, 60
Venezuela	60	1,3	120/240	2.4, 4.16, 4.8, 12.47, 13.8
Vietnam				6.6 (south) 10 (north) 15 (middle) 35 (entire)
Ban Me Thout	50	1,3	220/380	
Can Tho	50	1,3	127/220 220/380	
Dalat	50	1,3	120/208 220/380	
Da Nang	50	1,3	127/220	
Hue	50	1,3	127/220	
Khanh Hung	50	1,3	220/380	
Saigon	50	1,3	120/208 220/380	Note: State has plans to change to 22 kV for whole coun- try.
Virgin Islands	60	1,3	120/240	NA
Western Samoa	50	1,3	230/400	6.6, 22
Yemen	50	1,3	250/440	NA
Zaire	50	1,3	220/380	6.6, 15, 20, 30
Zambia	50	1,3	220/380	11, 33, 66

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

Country/City	Frequency (Hz)	Number of Phases	Low Voltage (V)	Medium Voltage (kV)
Zimbabwe				11, 22, 33, 66*
Bulawayo	50	1,3	230/400	
All Others	50	1,3	220/380	

\* Voltages listed are country-inclusive, all voltages listed for the country may not be found in individual cities listed.

## **Appendix B: Listing of 50 Hz Equipment, Manufacturers, and Vendors**

**ELECTRICAL EQUIPMENT****E104XX - Switches****E10400 - Toggle Switches**

Cooper Industries Inc./Arrow-Hart Component Products Division  
103 Hawthorn Street Hartford, CT 06105 203/249-8471  
POC: Kathy Krol  
Rep: Eaton Corporation Milwaukee, WI 414/449-7780

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

Square D Co./Consumer Products Division 1870 Roselle Road  
Hillcrest Commons Schaumburg, IL 60195  
708/397-9559 Fax: 708/397-8814  
POC: Doug Atkinson  
Rep: Square D Company Champaign, IL 217/356-0211

**E10410 - Dimmer Switches**

Cooper Industries Inc./Arrow-Hart Component Products Division  
103 Hawthorn Street Hartford, CT 06105 203/249-8471  
POC: Kathy Krol  
Rep: Eaton Corporation Milwaukee, WI 414/449-7780

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

Valmont Electric Inc. 1430 East Fairchild Street  
Danville, IL 61832 217/446-4600 Fax: 217/431-5740  
POC: Knox Wilkie

**E10420 - Explosionproof Switches**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Janco Corporation 3111-T Winona Avenue Burbank, CA 91504  
818/846-1800 Fax: 818/842-3396  
POC: Paul Gerritse

Micro Switch/Honeywell Division 11 West Spring Street  
Freeport, IL 61032 815/235-6600 Fax: 815/235-6545  
POC: Dave Hill

Square D Co./Consumer Products Division 1870 Roselle Road  
Hillcrest Commons Schaumburg, IL 60195  
708/397-9559 Fax: 708/397-8814  
POC: Doug Atkinson  
Rep: Square D Company Champaign, IL 217/356-0211

**E10430 - Disconnect Switches**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312-327-7200 Fax: 312/975-6349  
POC: Terese McGary

Boltswitch Inc. 6107 W. Lou Avenue Crystal Lake, IL 60014  
815/459-6900 Fax: 815/455-7788  
POC: Dick Rahn

Bridges Electric Inc. Industrial Park Hwy. 110 East P.O. Box 511  
Heber, AR 72543 501/362-8296 Fax: 501/362-6970  
POC: John Jones

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

**E10440 - Control Switches**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Boltswitch Inc. 6107 W. Lou Avenue Crystal Lake, IL 60014  
815/459-6900 Fax: 815/455-7788  
POC: Dick Rahn

Bridges Electric Inc. Industrial Park Hwy. 110 East P.O. Box 511  
Heber, AR 72543 501/362-8296 Fax: 501/362-6970  
POC: John Jones

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

**E10450 - Contactor Switches**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Boltswitch Inc. 6107 W. Lou Avenue Crystal Lake, IL 60014  
815/459-6900 Fax: 815/455-7788  
POC: Dick Rahn

Bridges Electric Inc. Industrial Park Hwy. 110 East P.O. Box 511  
Heber, AR 72543 501/362-8296 Fax: 501/362-6970  
POC: John Jones

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

**E10460 - Relay Switches**

Beckwith Electric Co. Inc. P.O. Box 2999 Largo, FL 34649-2999  
813/535-3408 Fax: 813/546-0121  
POC: Jim Harlow

Cooper Industries Inc./Arrow-Hart Component Products Division  
103 Hawthorn Street Hartford, CT 06105 203/249-8471  
POC: Kathy Krol  
Rep: Eaton Corporation Milwaukee, WI 414/449-7780

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E10470 - Safety Switches**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Boltswitch Inc. 6107 W. Lou Avenue Crystal Lake, IL 60014  
815/459-6900 Fax: 815/455-7788  
POC: Dick Rahn

Bridges Electric Inc. Industrial Park Hwy. 110 East P.O. Box 511  
Heber, AR 72543 501/362-8296 Fax: 501/362-6970  
POC: John Jones

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

**E10480 - Time Switches**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Boltswitch Inc. 6107 W. Lou Avenue Crystal Lake, IL 60014  
815/459-6900 Fax: 815/455-7788  
POC: Dick Rahn

Bridges Electric Inc. Industrial Park Hwy. 110 East P.O. Box 511  
Heber, AR 72543 501/362-8296 Fax: 501/362-6970  
POC: John Jones

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

**E106XX - Motor Starters****E10600 - Unfused Starters**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E10610 - Fused Starters**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840



Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E10620 - With Circuit Breaker**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E107XX - Fuses**

**E10700 - Fuses**

Cooper Industries/Cooper Power Systems/McGraw-Edison Power Systems  
P.O. Box 2850 Pittsburgh, PA 15230  
412/269-6700 Fax: 412/269-6761  
POC: Gary Patterson  
Rep: Vikeland Sales Inc. Addison, IL 708/832-8425

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

S and C Electric Co. 6601 North Ridge Boulevard  
Chicago, IL 60626 312/338-1000  
POC: Bob Tucker  
Rep: S and C Electric Co. St. Louis, MO 314/997-6440

Square D Co./Consumer Products Division 1870 Roselle Road  
Hillcrest Commons Schaumburg, IL 60195  
708/397-9559 Fax: 708/397-8814  
POC: Doug Atkinson  
Rep: Square D Company Champaign, IL 217/356-0211

**E10710 - Fuse Cabinets**

Cooper Industries/Cooper Power Systems/McGraw-Edison Power Systems  
P.O. Box 2850 Pittsburgh, PA 15230  
412/269-6700 Fax: 412/269-6761  
POC: Gary Patterson  
Rep: Vikeland Sales Inc. Addison, IL 708/832-8425

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

S and C Electric Co. 6601 North Ridge Boulevard  
Chicago, IL 60626 312/338-1000  
POC: Bob Tucker  
Rep: S and C Electric Co. St. Louis, MO 314/997-6440

Square D Co./Consumer Products Division 1870 Roselle Road  
Hillcrest Commons Schaumburg, IL 60195  
708/397-9559 Fax: 708/397-8814  
POC: Doug Atkinson  
Rep: Square D Company Champaign, IL 217/356-0211

**E109XX - Meter Centers and Sockets****E10900 - Miscellaneous**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Durham Company P.O. Box 908 Lebanon, MO 65536  
417/532-7121 Fax: 417/532-2366  
POC: John Chastain

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E110XX - Panelboards****E11000 - Miscellaneous**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7004 Fax: 315/477-5717  
POC: Carol Messinger

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

#### **E111XX - Circuit Breakers**

##### **E11100 - Miscellaneous**

A.S.C. Industries Inc./Power Distribution Group  
8967 Pleasantwood Avenue N.W. P.O. Box 2523  
North Canton, OH 44720-0523 216/499-1210 Fax: 216/499-1213  
POC: Mike Rice

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

#### **E112XX - Switchboards**

##### **E12000 - No Main Disconnect Switchboards**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E12010 - Fused Switch and CT Compartment Switchboards**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E12020 - Pressure Switch and CT Compartment Switchboards**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E12030 - Circuit Breaker, Molded Case, and CT Compartment Switchboards**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Durham Company P.O. Box 908 Lebanon, MO 65536  
417/532-7121 Fax: 417/532-2366  
POC: John Chastain

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E113XX - Switchboard Instruments****E11300 - AC Indicating, Ammeter and Switch**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E11310 - Voltmeters and Switches for Switchboards**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E11320 - Wattmeters for Switchboards**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E114XX - Motors****E11400 - Miscellaneous**

Bogue Electric Manufacturing Co. 100 Pennsylvania Avenue  
Paterson, NJ 07509 201/523-2200 Fax: 201/279-2973  
POC: Joseph DeCeglia

General Electric Co./Industry Sales and Services Division  
1 River Road Schenectady, NY 12345 518/385-2211  
POC: Gerry Engardio  
Rep: Dreisilher Electric Motors Glen Ellyn, IL 708/469-7510

Scott Fetzer Co./France Division 726 Fairview Blvd.  
Fairview, TN 37062 615/799-0551  
POC: Bernhard Braeuner

#### **E115XX - Transformers**

##### **E11500 - Buck-Boost Transformer**

Acme Electric/Acme Transformer Division 4815 West 5th Street  
Lumberton, NC 28358 919/738-1121 Fax: 919/739-0024  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

##### **E11510 - Dry Type Transformers**

Acme Electric/Acme Transformer Division 4815 West 5th Street  
Lumberton, NC 28358 919/738-1121 Fax: 919/739-0024  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Company 41 Woodford Avenue  
Plainville, CT 06062 309/664-1474  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E11520 - Isolating Transformers**

Acme Electric/Acme Transformer Division 4815 West 5th Street  
Lumberton, NC 28358 919/738-1121 Fax: 919/739-0024  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E11530 - Oil Filled Transformers**

A.B.B Power Transmission and Distribution Highway 58 West  
South Boston, VA 24592 804-575-2211 Fax:  
POC: Dick Stoakley  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

Niagra Transformer 1751 Dale Road  
Buffalo, NY 14225 716/896-6500 Fax: 716/896-8871  
POC: Bill Hanavan

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E11540 - Silicon Filled Transformers**

A.B.B Power Transmission and Distribution Highway 58 West  
South Boston, VA 24592 804-575-2211 Fax:  
POC: Dick Stoakley  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

Niagra Transformer 1751 Dale Road  
Buffalo, NY 14225 716/896-6500 Fax: 716/896-8871  
POC: Bill Hanavan

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E117XX - Computer Power Supplies****E11700 - Automatic Voltage Regulators**

Computer Power Inc. 124 West Main Street  
High Bridge, NJ 08829 908/638-8000 Fax: 908/638-4931  
POC: Tom Schreffler

General Signal Corporation/Sola Division 1717 Busse Road  
Elk Grove Village, IL 60007 708/439-2800 Fax: 708/439-1160  
POC: Tom McCaughn

Reliance Electric Co./Kato Engineering Co. 2075 Howard Drive  
Mankato, MN 56001 507/625-4011 Fax: 507/345-2798  
POC: Larry Sieberg

**E11710 - Isolation Transformer - Computer Grade**

Computer Power Inc. 124 West Main Street  
High Bridge, NJ 08829 908/638-8000 Fax: 908/638-4931  
POC: Tom Schreffler

Controlled Power Co. 1955 Stephenson Highway Troy, MI 48083  
313/528-3700 Fax: 313/528-0411  
POC: Ed Reschka

Rapid Power Technologies Inc. Graysbridge Road  
Brookfield, CT 06804 203/775-0411 Fax: 203/775-0666  
POC: Fred Eigenrauch

**E11720 - Transient Voltage Suppressor Transformer**

Computer Power Inc. 124 West Main Street  
High Bridge, NJ 08829 908/638-8000 Fax: 908/638-4931  
POC: Tom Schreffler

Controlled Power Co. 1955 Stephenson Highway Troy, MI 48083  
313/528-3700 Fax: 313/528-0411  
POC: Ed Reschka

Rapid Power Technologies Inc. Graysbridge Road  
Brookfield, CT 06804 203/775-0411 Fax: 203/775-0666  
POC: Fred Eigenrauch

**E11730 - Computer Regulator Transformer**

Computer Power Inc. 124 West Main Street  
High Bridge, NJ 08829 908/638-8000 Fax: 908/638-4931  
POC: Tom Schreffler

Controlled Power Co. 1955 Stephenson Highway Troy, MI 48083  
313/528-3700 Fax: 313/528-0411  
POC: Ed Reschka

Rapid Power Technologies Inc. Graysbridge Road  
Brookfield, CT 06804 203/775-0411 Fax: 203/775-0666  
POC Fred Eigenrauch

**E11740 - Power Conditioning Transformer**

Computer Power Inc. 124 West Main Street  
High Bridge, NJ 08829 908/638-8000 Fax: 908/638-4931  
POC: Tom Schreffler

Controlled Power Co. 1955 Stephenson Highway Troy, MI 48083  
313/528-3700 Fax: 313/528-0411  
POC: Ed Reschka



Rapid Power Technologies Inc. Graysbridge Road  
Brookfield, CT 06804 203/775-0411 Fax: 203/775-0666  
POC: Fred Eigenrauch

#### **E118XX - Power Systems**

##### **E11800 - Automatic Transfer Switches**

Asco Controls/Automatic Switch Company 50-60 Hanover Road  
Florham Park, NJ 07932 201/966-2000 Fax: 201/966-2628  
POC: Henry Dacko  
Rep: Automatic Switch Company Elk Grove, IL 708/640-3450

Caterpillar Inc. 100 N.E. Adams Street Peoria, IL 61629  
309/675-1000 Fax: 309/675-6155  
POC: Bob Kilper

Cyberex Inc. 7171 Industrial Park Blvd. Mentor, OH 44060  
216/946-1783 Fax: 216/946-5963  
POC: Ed Meluch

##### **E118010 - Non-automatic Transfer Switches**

Asco Controls/Automatic Switch Company 50-60 Hanover Road  
Florham Park, NJ 07932 201/966-2000 Fax: 201/966-2628  
POC: Henry Dacko  
Rep: Automatic Switch Company Elk Grove, IL 708/640-3450

Caterpillar Inc. 100 N.E. Adams Street Peoria, IL 61629  
309/675-1000 Fax: 309/675-6155  
POC: Bob Kilper

Cyberex Inc. 7171 Industrial Park Blvd. Mentor, OH 44060  
216/946-1783 Fax: 216/946-5963  
POC: Ed Meluch

##### **E11820 - Generator Set**

Bogue Electric Manufacturing Co. 100 Pennsylvania Avenue  
Paterson, NJ 07509 201/523-2200 Fax: 201/279-2973  
POC: Joseph DeCeglia

Caterpillar Inc. 100 N.E. Adams Street Peoria, IL 61629  
309/675-1000 Fax: 309/675-6155  
POC: Bob Kilper

Cresswood Industrial Furnaces 4504-T Ellwalk Ave. Cortland, IL 60112  
800-962-7302 Ext. 71  
POC: Larry Reiling

Dresser Rand Co./Steam Turbine, Motor and Generator Division  
800 Central Avenue Minneapolis, MN 55413-2403  
612/378-8000 Fax: 612/378-8050  
POC: Tim Spence

**E11830 - Line Poles, Towers, and Overhead Line Conductors**

A.B. Chance Co. 210 North Allen Street  
Centralia, MO 65240-1395 314/682-5521  
POC: Joe Johnson

Bridges Electric Inc. Industrial Park Hwy. 110 East  
Heber, AR 72543 501/362-8296 Fax: 501/362-6970  
POC: John Jones

Lapp Insulator Co./Power Structures Inc. P.O. Box 6261  
New Orleans, LA 70174 504/394-7433 Fax: 504/391-9692  
POC: Pat Deloney

Lindsey Manufacturing Co. 760 North Georgia Avenue  
Azusa, CA 91702 818/969-3471 Fax: 818/969-3177  
POC: Jiji Smith

**E11840 - Substation Equipment**

Challenger Electrical Equipment Corp. 508 Lapp Road  
Malvern, PA 19355 215/647-5000 Fax: 215/640-0568  
POC: Rose Harris  
Rep: Challenger Electrical Elk Grove Village, IL 708/595-3840

General Electric Co./Industry Sales and Services Division  
1 River Road Schenectady, NY 12345 518/385-2211  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Square D Co./Distribution Equipment Division  
1601 Mercer Road Lexington, KY 40511 606/254-6412  
POC: Doug Atkinson  
Rep: Square D Company Champaign, IL 217/356-0211

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E119XX - Capacitors****E11900 - Indoor**

Cooper Industries/Cooper Power Systems/McGraw-Edison Power Systems  
P.O. Box 2850 Pittsburgh, PA 15230  
412/269-6700 Fax: 412/269-6761  
POC: Gary Patterson  
Rep: Vikeland Sales Inc. Addison, IL 708/832-8425

General Electric Co./Industry Sales and Services Division  
1 River Road Schenectady, NY 12345 518/385-2211  
POC: Warren Molitor  
Rep: General Electric Co. Bloomington, IL 309/664-1474

Westinghouse Electric Supply Co. 603 North Gilbert Street  
Danville, IL 61832 217/442-1901 Fax: 217/442-7317  
POC: Butch Feters

**E120XX - Exit and Emergency Lighting****E12000 - Exit Light - Single Face - Incandescent**

Chloride Systems/Lighting Alliance 4415 West Harrison Street  
Suite 234 Hillside, IL 60162  
708/449-8822 Fax: 708/449-8835  
POC: Ed Vormann

Cornerstone Direct Corp./Ready Made Sign Co. Inc. 480 Fillmore Ave.  
Tonawanda, NY 14151 716/695-7300 Fax: 800/222-1934  
POC: Dan Howes

Dual-Lite Inc. Simm Lane P.O. Box 468 Newtown, CT 06470  
203/426-8011 Fax: 203/426-7486  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

**E12010 - Exit Light - Single Face - Fluorescent**

Chloride Systems/Lighting Alliance 4415 West Harrison Street  
Suite 234 Hillside, IL 60162  
708/449-8822 Fax: 708/449-8835  
POC: Ed Vormann

Cornerstone Direct Corp./Ready Made Sign Co. Inc. 480 Fillmore Ave.  
Tonawanda, NY 14151 716/695-7300 Fax: 800/222-1934  
POC: Dan Howes

Dual-Lite Inc. Simm Lane P.O. Box 468 Newtown, CT 06470  
203/426-8011 Fax: 203/426-7486  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

**E12020 - Exit Light - Double Face - Incandescent**

Chloride Systems/Lighting Alliance 4415 West Harrison Street  
Suite 234 Hillside, IL 60162  
708/449-8822 Fax: 708/449-8835  
POC: Ed Vormann

Cornerstone Direct Corp./Ready Made Sign Co. Inc. 480 Fillmore Ave.  
Tonawanda, NY 14151 716/695-7300 Fax: 800/222-1934  
POC: Dan Howes

Dual-Lite Inc. Simm Lane P.O. Box 468 Newtown, CT 06470  
203/426-8011 Fax: 203/426-7486  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

**E12030 - Exit Light - Double Face - Fluorescent**

Chloride Systems/Lighting Alliance 4415 West Harrison Street  
Suite 234 Hillside, IL 60162  
708/449-8822 Fax: 708/449-8835  
POC: Ed Vormann

Cornerstone Direct Corp./Ready Made Sign Co. Inc. 480 Fillmore Ave.  
Tonawanda, NY 14151 716/695-7300 Fax: 800/222-1934  
POC: Dan Howes

Dual-Lite Inc. Simm Lane P.O. Box 468 Newtown, CT 06470  
203/426-8011 Fax: 203/426-7486  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

**E12040 - Emergency Light Units - Battery Operated**

Chloride Systems/Lighting Alliance 4415 West Harrison Street  
Suite 234 Hillside, IL 60162  
708/449-8822 Fax: 708/449-8835  
POC: Ed Vormann

Cornerstone Direct Corp./Ready Made Sign Co. Inc. 480 Fillmore Ave.  
Tonawanda, NY 14151 716/695-7300 Fax: 800/222-1934  
POC: Dan Howes

Dual-Lite Inc. Simm Lane P.O. Box 468 Newtown, CT 06470  
203/426-8011 Fax: 203/426-7486  
POC: Patti Grimmet  
Rep: Electri Agency Inc. Elk Grove, IL 708/439-5030

**E121XX - Light Fixtures**

**E12100 - External Incandescent Light Fixtures**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Corbett Lighting Inc. 2727 Northhaven Road Dallas, TX 75229  
214/241-8800 Fax: 214/241-4239  
POC: Dave Meyer  
Rep: Total Lighting Concepts Hillside, IL 708/449-2022  
Prescolite/U.S.I. Lighting 1251 Doolittle Drive  
San Leandro, CA 94577 415/562-3500  
POC: Mark Benguerel

**E12110 - External Sodium and Mercury Vapor Light Fixtures**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Lumark Lighting/Cooper Lighting 400 Busse Road  
Elk Grove Village, IL 60007  
312/956-8400 Fax: 312/956-1537  
POC: James Byrket  
Rep: Westinghouse Supply Co. Danville, IL 217/442-1901

Prescolite/U.S.I. Lighting 1251 Doolittle Drive  
San Leandro, CA 94577 415/562-3500  
POC: Mark Benguerel

**E12120 - Internal Incandescent Light Fixtures**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Corbett Lighting Inc. 2727 Northhaven Road Dallas, TX 75229  
214/241-8800 Fax: 214/241-4239  
POC: Dave Meyer  
Rep: Total Lighting Concepts Hillside, IL 708/449-2022

Prescolite/U.S.I. Lighting 1251 Doolittle Drive  
San Leandro, CA 94577 415/562-3500  
POC: Mark Benguerel

**E12130 - Internal Fluorescent, Metal Halide, and Sodium Light Fixtures**

Appleton Electric Co. 1701 W. Wellington Ave. Chicago, IL 60657  
312/327-7200 Fax: 312/975-6349  
POC: Terese McGary

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Lumark Lighting/Cooper Lighting 400 Busse Road  
Elk Grove Village, IL 60007  
312/956-8400 Fax: 312/956-1537  
POC: James Byrket  
Rep: Westinghouse Supply Co. Danville, IL 217/442-1901

Prescolite/U.S.I. Lighting 1251 Doolittle Drive  
San Leandro, CA 94577 415/562-3500  
POC: Mark Benguerel

**E123XX - Time System Components**

**E12300 - Clocks, Bells, Master Controller, Frequency Generator**

Eagle Electric Manufacturing Co. Inc. 45-31 Court Square  
Long Island City, NY 11101 718/937-8000 Fax: 718/482-0160  
POC: Harlan Berman

Electric Time Co. Inc. 45 West Street Medfield, MA 02052  
508/359-4396 Fax: 508/359-4482  
POC: Tom Erb

Nu Tone Inc. Madison and Red Bank Roads  
Cincinnati, OH 45227 513/527-5100  
POC: Mike Walsh

Simplex Time Recorder Co. Simplex Plaza  
Gardner, MA 01441-0001 508/632-2500  
POC: Dave Ringland  
Rep: Simplex Time Recorder Co. East Peoria, IL 309/694-8000

**E124XX - Detection Systems (Except Fire)****E12400 - Burglar Alarm Systems**

Burle Industries Inc./Security Products 1000 New Holland Avenue  
Lancaster, PA 17601-5688 717/295-6123 Fax: 717/295-6097  
POC: Steve Neil

Detection Systems Inc. 130 Perinton Parkway  
Fairport, NY 14450 716/223-4060 Fax: 716/223-9180  
POC: Jeff Matrachisia

Monaco Enterprises Inc. East 14820 Sprague Avenue  
Spokane, WA 99214-0129 509/926-6277 Fax: 509/924-4980  
POC: Dan Long

Pittway Corporation/Ademco Division 180 Michael Drive  
Syosset, NY 11791 516/921-6700 Fax: 516/921-6700  
POC: Tony Franco

Racon Incorporated 12628 Interurban Avenue South  
Seattle, WA 98168 206/241-1110 Fax: 206/246-9306  
POC: Tim Tewey

**E12410 - Doorbell Systems**

Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
Wolf and 7th North Streets P.O. Box 4999 Syracuse, NY 13221  
315/477-7000 Fax: 315/477-5717  
POC: Carol Messinger

Monaco Enterprises Inc. East 14820 Sprague Avenue  
Spokane, WA 99214-0129 509/926-6277 Fax: 509/924-4980  
POC: Dan Long

Nu Tone Inc. Madison and Red Bank Roads  
Cincinnati, OH 45227 513/527-5100  
POC: Mike Walsh

Pittway Corporation/Ademco Division 180 Michael Drive  
Syosset, NY 11791 516/921-6700 Fax: 516/921-6700  
POC: Tony Franco

**E12420 - Surveillance**

Burle Industries Inc./Security Products 1000 New Holland Avenue  
Lancaster, PA 17601-5688 717/295-6123 Fax: 717/295-6097  
POC: Steve Neil

Nu Tone Inc. Madison and Red Bank Roads  
Cincinnati, OH 45227 513/527-5100  
POC: Mike Walsh

Wells Fargo Security Products 1010 North Glebe Road  
Arlington, VA 22201 703/247-4250  
POC: Dallas Steele

**E127XX - P.A. and Sound Systems**

**E12700 - Public Address Systems**

Paso Sound Products Inc. 14 First Street  
Pelham, NY 10803-1495 914/738-4800 Fax: 914/738-3954  
POC: Ken O'Brien

Rauland-Borg Corp. 3450 West Oakton Street  
Skokie, IL 60076-2951 708/679-0900 Fax: 708/679-0625  
POC: Bill Martin  
Rep: Life Safety Design Danville, IL 217/446-2564

Three M Co.(3M)/Sound Products 3M Center Building 551-1W-01  
St. Paul, MN 55144-1000 612/733-9214 Fax: 612/736-7614  
POC: Paul Nitschke

**E12710 - Intercoms**

Nu Tone Inc. Madison and Red Bank Roads  
Cincinnati, OH 45227 513/527-5100  
POC: Mike Walsh

Paso Sound Products Inc. 14 First Street  
Pelham, NY 10803-1495 914/738-4800 Fax: 914/738-3954  
POC: Ken O'Brien

Rauland-Borg Corp. 3450 West Oakton Street  
Skokie, IL 60076-2951 708/679-0900 Fax: 708/679-0625  
POC: Bill Martin  
Rep: Life Safety Design Danville, IL 217/446-2564

Three M Co.(3M)/Sound Products 3M Center Building 551-1W-01  
St. Paul, MN 55144-1000 612/733-9214 Fax: 612/736-7614  
POC: Paul Nitschke

**E12720 - Emergency Call Systems**

Nu Tone Inc. Madison and Red Bank Roads  
Cincinnati, OH 45227 513/527-5100  
POC: Mike Walsh

Paso Sound Products Inc. 14 First Street  
Pelham, NY 10803-1495 914/738-4800 Fax: 914/738-3954  
POC: Ken O'Brien

Rauland-Borg Corp. 3450 West Oakton Street  
Skokie, IL 60076-2951 708/679-0900 Fax: 708/679-0625  
POC: Bill Martin  
Rep: Life Safety Design Danville, IL 217/446-2564

Three M Co.(3M)/Sound Products 3M Center Building 551-1W-01  
St. Paul, MN 55144-1000 612/733-9214 Fax: 612/736-7614  
POC: Paul Nitschke

**E12730 - Sound System Components**

Paso Sound Products Inc. 14 First Street  
Pelham, NY 10803-1495 914/738-4800 Fax: 914/738-3954  
POC: Ken O'Brien

Rauland-Borg Corp. 3450 West Oakton Street  
Skokie, IL 60076-2951 708/679-0900 Fax: 708/679-0625  
POC: Bill Martin  
Rep: Life Safety Design Danville, IL 217/446-2564

Three M Co.(3M)/Sound Products 3M Center Building 551-1W-01  
St. Paul, MN 55144-1000 612/733-9214 Fax: 612/736-7614  
POC: Paul Nitschke

**E12740 - House Telephone System**

Comdial Corporation 1180 Seminole Trail  
Charlottesville, VA 22906  
800/347-1432 Fax: 804/978-2293  
POC: Frank Feliciano

Cortelco Inc./I.T.T. Telephones  
Fulton Drive Corinth, MS 38834  
601/287-5281 Fax: 601/287-1473  
POC: Mark Daniel

Motorola Inc. 1475 West Shure Drive  
Arlington Heights, IL 60004  
708/632-5000 Fax: 708/632-6034  
POC: Marge Seda

**E129XX - Fire Alarm Equipment****E12900 - Miscellaneous**

Detection Systems Inc. 130 Perinton Parkway  
Fairport, NY 14450 716/223-4060 Fax: 716/223-9180  
POC: Jeff Matrachisia



Fire-Lite Alarms Inc. 12 Clintonville Road  
Northford, CT 06472 203/484-7161 Fax: 203/484-7118  
POC: Ray Weymann

Monaco Enterprises Inc. East 14820 Sprague Avenue  
Spokane, WA 99214-0129 509/926-6277 Fax: 509/924-4980  
POC: Dan Long

Pittway Corporation/Ademco Division 180 Michael Drive  
Syosset, NY 11791 516/921-6700 Fax: 516/921-6700  
POC: Tony Franco

Pittway Corporation/Notifier Division 12 Clintonville Road  
Northford, CT 06472 800/289-3473 Fax: 203/484-7118  
POC: Ray Weymann

#### **E12910 - Smoke/Heat Detectors**

Detection Systems Inc. 130 Perinton Parkway  
Fairport, NY 14450 716/223-4060 Fax: 716/223-9180  
POC: Jeff Matrachisia

Fire-Lite Alarms Inc. 12 Clintonville Road  
Northford, CT 06472 203/484-7161 Fax: 203/484-7118  
POC: Ray Weymann

Pittway Corporation/Ademco Division 180 Michael Drive  
Syosset, NY 11791 516/921-6700 Fax: 516/921-6700  
POC: Tony Franco

Pittway Corporation/Notifier Division 12 Clintonville Road  
Northford, CT 06472 800/289-3473 Fax: 203/484-7118  
POC: Ray Weymann

#### **E13000 - Receptacles**

International Configuration Inc.  
P.O. Box 3374 Enfield, CT 06082  
203-749-6380 Fax: 203-749-2985  
POC: Harold Mitchell

Pass & Seymour/LeGrand 344 Carol Lane  
Elmhurst, IL 60126 708-832-2500 Fax: 708-323-2524  
POC: Jim Knapi

Panel Components Corp. P.O. Drawer 6626  
Santa Rosa, CA 95406 707-534-0600 Fax: 707-578-5478  
POC: Kim Eades

#### **E13010 - Receptacles**

International Configuration Inc.  
P.O. Box 3374 Enfield, CT 06082  
203-749-6380 Fax: 203-749-2985  
POC: Harold Mitchell

Pass & Seymour/LeGrand 344 Carol Lane  
Elmhurst, IL 60126 708-832-2500 Fax: 708-323-2524  
POC: Jim Knapi

Panel Components Corp. P.O. Drawer 6626  
Santa Rosa, CA 95406 707-534-0600 Fax: 707-578-5478  
POC: Kim Eades

**MECHANICAL EQUIPMENT****M100XX - Swimming Pools and Equipment****M10000 - Heaters**

Bryan Steam Corp PO Box 27 Peru, IN 46970  
317-473-6651 Fax: 317-473-3074  
POC: Bob Warren  
Rep: Cummings-Wagner Annapolis, MD 301-490-9007

Coates Heater Co Inc 18250 68th Ave S Kent, WA 98032  
206-872-7256 Fax: 206-251-0830  
POC: Bob Wisenburg

Dumont Industries Main St PO Box 148 Monmouth, ME 04259  
207-933-4811 Fax: 207-933-2649  
POC: Greg Wilson

Electric Heater Co. 45 Seymour St PO Box 288 Stratford, CT 06497-0288  
203-378-2659 Fax: 203-378-3593  
POC: Bill Newbauer, Jr.

Great Lakes Chemical Corp/Hydrotech Chemical Corp PO Box 6549  
Marietta, GA 30065-6549 404-952-2581 800-241-3303  
Fax: 404-953-2109  
POC: Chris Heflin / Gary McCoppin (Product Manager)

Little Giant Manufacturing Co Inc 907 7th St PO Box 518  
Orange, TX 77630 409-883-4246 800-231-6035  
POC: Alan McCorquodale

Lochinvar Corp 2005 Elm Hill Park Nashville, TN 37210  
615-889-8900 Fax: 615-885-4403  
POC: Scott Armstrong

Smith Corp/Smith Water Products Co 5605 Mac Arthur Blvd Suite 360  
Irving, TX 75038 214-518-1990 800-527-1953 Fax: 214-518-1736  
POC: Paul Woodward

**M10010 - Underwater Lights**

Genlyte Group Inc/Imperial Bronzelite 500 Wonder World Dr PO Box 606  
San Marcos, TX 78666 512-392-5821 512-392-8957  
Fax: 512-353-5822  
POC: Clark Douglas

Great Lakes Chemical Corp/Hydrotech Chemical Corp PO Box 6549  
Marietta, GA 30065-6549 404-952-2581 800-241-3303  
Fax: 404-953-2109  
POC: Gary McCoppin

Paddock Pool Equipment Co Inc 555 Paddock Pkwy PO Box 11676  
Rock Hill, SC 29730 803-324-1111 Fax: 803-324-1116  
POC: Eddie Graves

W M Hobbs, LTD 3786 Norhteast Expressway Atlanta, GA 30340  
404-457-3000  
POC: Roger Graham

**M10020 - Filters**

ESSEF Industries Inc/Pac-Fab Inc 1620 Hawkins Ave Sanford, NC 27330  
919-774-4151 800-833-3692 Fax: 919-774-4841  
POC: Doug Stout

Great Lakes Chemical Corp/Hydrotech Chemical Corp PO Box 6549  
Marietta, GA 30065-6549 404-952-2581 800-241-3303  
Fax: 404-953-2109  
POC: Gary McCoppin

Paddock Pool Equipment Co Inc 555 Paddock Pkwy PO Box 11676  
Rock Hill, SC 29730 803-324-1111 Fax: 803-324-1116  
POC: Eddie Graves

W M Hobbs, LTD 3786 Norhteast Expressway Atlanta, GA 30340  
404-457-3000  
POC: Roger Graham

**M101XX - Water Heaters****M10100 - Gas Fired Water Heaters**

Aldrich Co 341 E Williams St PO Box 97 Wyoming, IL 61491-0097  
309-695-2311 Fax: 309-695-5779  
POC: Ned Howard

Lochinvar Corp 2005 Elm Hill Park Nashville, TN 37210  
615-889-8900 Fax: 615-885-4403  
POC: Scott Armstrong

Mor-Flo Industries Inc/American Appliance Manufacturing Corp  
PO Box 1956 Santa Monica, CA 90406 213-829-1755  
Fax: 213-828-1940  
POC: Jim Yerman

Rheem Manufacturing Co/Ruud Water Heater Div  
5780 Peachtree-Dunwoody Road NE Atlanta, GA 30342  
205-260-1500 800-432-8373  
POC: Russel Maddox / Roger Clark

Smith Corp/Smith Water Products Co 5605 Mac Arthur Blvd Suite 360  
Irving, TX 75038 214-518-1990 Fax: 214-518-1736  
POC: Paul Woodward

State Industries Inc 500 By-Pass Rd Ashland City, TN 37015  
615-792-4371 800-365-0024 Fax: 800-365-FAX2  
POC: Ben Major

Weben-Jarco Inc 4007 Platinum Way PO Box 763460  
Dallas, TX 75376-3460 214-637-0530 800-527-6449  
Fax: 214-330-6864  
POC: Doug Kinser  
Rep: (Wash., D.C.) Steck Sales 301-948-7502

**M10110 - Electric Water Heaters**

Lochinvar Corp 2005 Elm Hill Park Nashville, TN 37210  
615-889-8900 Fax: 615-885-4403  
POC: Scott Armstrong

Mor-Flo Industries Inc/American Appliance Manufacturing Corp  
PO Box 1956 Santa Monica, CA 90406 213-829-1755  
Fax: 213-828-1940  
POC: Jim Yerman

Rheem Manufacturing Co/Ruud Water Heater Div  
5780 Peachtree-Dunwoody Road NE Atlanta, GA 30342  
205-260-1500 800-432-8373  
POC: Russell Maddox / Roger Clark

Smith Corp/Smith Water Products Co 5605 Mac Arthur Blvd Suite 360  
Irving, TX 75038 214-518-1990 Fax: 214-518-1736  
POC: Paul Woodward

State Industries Inc 500 By-Pass Rd Ashland City, TN 37015  
615-792-4371 800-365-0024 Fax: 800-365-FAX2  
POC: Ben Major

**M10120 - Oil Fired Water Heaters**

Aldrich Co 341 E Williams St PO Box 97 Wyoming, IL 61491-0097  
309-695-2311 Fax: 309-695-5779  
POC: Ned Howard

Lochinvar Corp 2005 Elm Hill Park Nashville, TN 37210  
615-889-8900 Fax: 615-885-4403  
POC: Scott Armstrong

Smith Corp/Smith Water Products Co 5605 Mac Arthur Blvd Suite 360  
Irving, TX 75038 214-518-1990 Fax: 214-518-1736  
POC: Paul Woodward

**M102XX - Boilers**

**M10200 - Electric Boilers**

Bryan Steam Corp PO Box 27 Peru, IN 46970  
317-473-6651 Fax: 317-473-3074  
POC: Bob Warren  
Rep: Cummings-Wagner Annapolis, MD 301-490-9007

Lochinvar Corp 2005 Elm Hill Park Nashville, TN 37210  
615-889-8900 Fax: 615-885-4403  
POC: Scott Armstrong

Marley Co/Weil-Mc Lain Blaine St Michigan City, IN 46360  
219-879-6561  
POC: Jim Wells / Jim Platt

Precision Parts Corp 4340 E Main St PO Box 2159 Morristown, TN 37814  
615-587-9390 Fax: 615-581-7749  
POC: Mark Cole

**M10210 - Solid Fuel Boilers**

Coppus Engineering Corp/Kewanee Boiler Co Inc 101 Franklin St  
Kewanee, IL 61443 309-853-3541 Fax: 309-852-3541  
POC: Rod Young  
Rep: Fairbanks and Associates Arlington, VA 703-931-1313

Cresswood Industrial Furnaces 4504-T Ellwalk Ave. Cortland, IL 60112  
800-962-7302 Ext. 71  
POC: Larry Reiling

Industrial Boiler Company Inc. P.O. Drawer 2258 Thomasville, GA 31792  
Thomasville, GA 31792 912-226-3024 Fax: 912-226-3027  
POC: Mark Nesmith

**M10220 - Oil Fired Boilers**

Ajax Boiler Inc 17700 S. Main St Gardena, CA 90248  
213-321-2815  
POC: Larry Miracle

Aldrich Co 341 E Williams St. PO Box 97 Wyoming, IL 61491-0097  
309-695-2311 Fax: 309-695-5779  
POC: Ned Howard

Columbia Boiler Co Of Pottstown PO Box G Pottstown, PA 19464  
215-323-2700  
POC: Barry Loar

Coppus Engineering Corp/Kewanee Boiler Co Inc 101 Franklin St  
Kewanee, IL 61443 309-853-3541 Fax: 309-852-3541  
POC: Rod Young  
Rep: Fairbanks and Associates Arlington, VA 703-931-1313

Crown Industries Inc 3633 I St Philadelphia, PA 19134  
215-535-8900 Fax: 215-535-9736  
POC: Paul Sohler

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones (x333)

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Hydrotherm Inc Rockland Ave Northvale, NJ 07647  
201-768-5500 Fax: 201-768-3464  
POC: Floyd Lewis/Joe Beshar (V.P.)

Marley Co/Weil-Mc Lain Blaine St Michigan City, IN 46360  
219-879-6561  
POC: Jim Wells / Jim Platt

Parker Boiler Co 5930 Bandini Blvd Los Angeles, CA 90040-2999  
213-727-9800 Fax: 213-722-2848  
POC: Martin Bender / Greg Danenhauer

**M10230 - Gas Fired Boilers**

Ajax Boiler Inc 17700 S. Main St Gardena, CA 90248  
213-321-2815  
POC: Larry Miracle

Aldrich Co 341 E Williams St. PO Box 97 Wyoming, IL 61491-0097  
309-695-2311 Fax: 309-695-5779  
POC: Ned Howard

Bryan Steam Corp PO Box 27 Peru, IN 46970  
317-473-6651 Fax: 317-473-3074  
POC: Bob Warren  
Rep: (Wash., D.C.) Cummins-Wagner Annapolis, MD 301-490-9007

Columbia Boiler Co Of Pottstown PO Box G Pottstown, PA 19464  
215-323-2700  
POC: Barry Loar

Coppus Engineering Corp/Kewanee Boiler Co Inc 101 Franklin St  
Kewanee, IL 61443 309-853-3541 Fax: 309-852-3541  
POC: Rod Young  
Rep: Fairbanks and Associates Arlington, VA 703-931-1313

Crown Industries Inc 3633 I St Philadelphia, PA 19134  
215-535-8900 Fax: 215-535-9736  
POC: Paul Sohler

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones (x333)

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Hydrotherm Inc Rockland Ave Northvale, NJ 07647  
201-768-5500 Fax: 201-768-3464  
POC: Floyd Lewis / Joe Beshar (V.P.)

Lochinvar Corp 2005 Elm Hill Park Nashville, TN 37210  
615-889-8900 Fax: 615-885-4403  
POC: Scott Armstrong

Marley Co/Weil-Mc Lain Blaine St Michigan City, IN 46360  
219-879-6561  
POC: Jim Wells

Parker Boiler Co 5930 Bandini Blvd Los Angeles, CA 90040-2999  
213-727-9800 Fax: 213-722-2848  
POC: Martin Bender / Greg Danenhauer

Precision Parts Corp 4340 E Main St PO Box 2159 Morristown, TN 37814  
615-587-9390 Fax: 615-581-7749  
POC: Mark Cole

Smith Corp/Smith Water Products Co 5605 Mac Arthur Blvd Suite 360  
Irving, TX 75038 214-518-1990 Fax: 214-518-1736  
POC: Paul Woodward

#### **M103XX - Duct Heaters**

##### **M10300 - Duct Heaters**

Emerson Electric Co/Wiegand Div 641 Alpha Drive Pittsburgh, PA 15238  
412-967-3900  
POC: Gary Ozegovich (Rep)  
Rep: Faber-Renoff Baltimore, MD 301-768-4554

Hastings Industries Inc Hastings Industrial Pk E PO Box 548  
Hastings, NE 68901-0548 402-463-9821  
POC: Gary Brooks (Rep)  
Rep: Brooks Co Bloomington, IL 309-452-2012

Reed National Corp/Sterling Radiator Div 260 N Elm St  
Westfield, MA 01085 413-568-9571 Fax: 413-568-9613  
POC: Cliff Greaves (Rep)  
Rep: Cliff Greaves Co Washington, D.C. 919-288-3588

Stamm International Group/Powrmatic Inc 2906 Baltimore Blvd  
Finksburg, MD 21048 301-833-9100 800-966-9100  
Fax: 800-966-7971  
POC: Frank McGready / Melvin Anderson (Pres.)

#### **M104XX - Furnaces**

##### **M10400 - Hot Air Heating**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service 301-984-2400

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones (x333)



Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Steve / Tony

Reed National Corp/Sterling Alton, Applied Air Div 4830 Transport Dr  
Dallas, TX 75247 214-638-6010 Fax: 214-638-2395  
POC: Scott Stallings / Buddy Cross

Reed National Corp/Sterling Radiator Div 260 N Elm St  
Westfield, MA 01085 413-568-9571 Fax: 413-568-9613  
POC: Cliff Greaves (Rep)  
Rep: Cliff Greaves Co Washington, D.C. 919-288-3588

Siebring Manufacturing Inc/Siebring Battery Div PO Box 658  
George, IA 51237 712-475-3317 Fax: 712-475-3490  
POC: Linden Hass

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: (Washington, D.C.) 301-792-8181

**M10410 - Combination Heating/Cooling Systems**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service 301-984-2400

Blaw-Knox Corp/Hupp Co, Typhoon Air Conditioning Div 1135 Ivanhoe Rd  
Cleveland, OH 44110 216-851-6200 Fax: 216-851-6274  
POC: Joe Marino (x394)

Command-Aire Corp PO Box 7916 Waco, TX 76714-7916  
817-840-3244 Fax: 817-840-2639  
POC: Ellen Trick (Home Ofc.) / Jan Clark (Rep)  
Rep: (Wash., D.C.) 301-984-2400

Hastings Industries Inc Hastings Industrial Pk E PO Box 548  
Hastings, NE 68901-0548 402-463-9821  
POC: Gary Brooks (Rep)  
Rep: Brooks Co Bloomington, IL 309-452-2012

Heil-Quaker Corp/Tempstar Heating and Cooling Products  
1136 Heil Quaker Blvd PO Box 3005 La Vergne, TN 37086-1985  
615-793-0450 800-447-2882  
POC: Claude Hayes

Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Steve / Tony

Reed National Corp/Sterling Alton, Applied Air Div 4830 Transport Drive  
Dallas, TX 75247 214-638-6010 Fax: 214-638-2395  
POC: Scott Stallings / Buddy Cross

**M105XX - Appliances****M10500 - Kitchen Appliances**

Maytag Company 1 Dependability Square Newton, IA 50208  
515-792-7000 Fax: 515-791-8395  
POC: Tom Weeks

Whirlpool Corporation - Consumer Services 2303 Pipestone Road  
Benton Harbor, MI 49022 800-253-1301 Fax: 616-927-7829  
POC: Timothy Costello

White Westinghouse International 10 Parkway Center Drive  
Pittsburgh, PA 15220 412-928-8555 Fax: 412-928-0922  
POC: Kurt Rogers

**M10510 - Laundry Appliances**

Maytag Company 1 Dependability Square Newton, IA 50208  
515-792-7000 Fax: 515-791-8395  
POC: Tom Weeks

Speed Queen Co. Shepard St. PO Box 990 Ripon, WI 54971-0990  
414-748-3121  
POC: Mike Besaw

Whirlpool Corporation - Consumer Services 2303 Pipestone Road  
Benton Harbor, MI 49022 800-253-1301 Fax: 616-927-7829  
POC: Donna Lynn

**M10520 - Central Vacuum Cleaning**

Central Vac International Incorporated 3133 East 12th Street  
Los Angeles, CA 90023 213-268-1135 Fax: 213-268-9684  
POC: George Crossman

Clarkson Industries Inc/Hoffman Air and Filtration Systems Div. PO Box 548  
East Syracuse, NY 13057-0548 315-437-0311 800-258-8088  
Fax: 315-432-8682  
POC: Carl Wuerslin (Home Ofc.) / Ed Orndoff (Rep)  
Rep: Neo Associates 717-359-9800

Sequoia Vacuum Systems Incorporated 164 Jefferson Drive  
Menlo Park, CA 94025 415-322-7281 Fax: 415-322-8745  
POC: Mike White

**M106XX - Pumps****M10600 - General**

AMW Industries, Inc. 584 Commerce P.O. Box 1364 Conway, AR 72032  
501-329-9811 Fax: 501-329-9812  
POC: Sarah Moncada  
Rep: (Wash., D.C.) Sam Desanto 301-881-8848

General Signal Corp/Aurora Pump 800 Airport Rd.  
North Aurora, IL 60542 708-859-7000 Fax: 708-859-7000  
POC: Shirley Fezekas (Home Ofc.) / David (Rep)  
Rep: General Pump and Machine Peoria, IL 309-693-7444

Marley Pump Co/Red Jacket Pumps Div 5800 Fox Ridge Dr  
Mission, KS 66202 913-831-5700 800-468-7867 Fax: 913-831-5145  
POC: Kay Poirier

Peerless Pump 1200 Sycamore St. Montebello, Ca 90640  
213-726-1232  
POC: Tom Martin (Chicago Ofc - 708-298-2616)

Weil Pump Co 5921 W. Dickens Ave Chicago, IL 60639  
312-637-8844 Fax: 312-637-5168  
POC: David Leidy (x263)

**M108XX - Fire Detection and Extinguishing Systems \*\* See E129XX \*\***

**M109XX - Heat Exchangers and Heat Recovery Packages**

**M10900 - Heat Exchangers**

Amsted Industries Inc/Baltimore Aircoil Co Inc PO Box 7322  
Baltimore, MD 21227 301-799-1300 Fax: 301-799-6416  
POC: Roger Sauter (Rep)  
Rep: A. Lombard and Co. (Illinois) 708-299-8010

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Hydrotherm Inc Rockland Ave Northvale, NJ 07647  
201-768-5500 Fax: 201-768-3464  
POC: Floyd Lewis / Joe Beshar (V.P.)

Zero Corp/Mc Lean Midwest 4000 83rd Ave N  
Brooklyn Park, MN 55443-2594 612-561-9400 800-284-2445  
Fax: 612-569-0533  
POC: Chip Lyon

**M10910 - Heat Recovery Packages**

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones

Hastings Industries Inc Hastings Industrial Pk E PO Box 548  
Hastings, NE 68901-0548 402-463-9821  
POC: Gary Brooks (Rep)  
Rep: Brooks Co Bloomington, IL 309-452-2012

Rupp Industries Inc 11550 Rupp Dr Burnsville, MN 55337  
612-894-3000 800-231-1882 Fax: 612-894-7877  
POC: Terry Heer

#### M110XX - Humidifiers

##### M11000 - Humidifiers

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Carnes Co Inc 448 S Main St Verona, WI 53593  
608-845-6411 Fax: 608-845-6470  
POC: Jeff Lien (Home Ofc.) / Patty King (Rep)  
Rep: S.E. Nelson Co Barke, VA 703-866-0200

Skuttle Manufacturing Co Route 10 Marietta, OH 45750  
614-373-9169 800-848-9786 Fax: 614-373-9565  
POC: Earl Lewis, Jr.

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
Carrier Pkwy PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

#### M111XX - Fans

##### M11100 - Exhaust Fans

Airmaster Fan Co 150 W North St PO Box 968 Jackson, MI 49204-0968  
517-764-2300 800-255-3084 Fax: 517-787-3336  
POC: Sales

American Coolair Corp 3604 Mayflower St PO Box 2300  
Jacksonville, FL 32203 904-389-3646 Fax: 904-387-3449  
POC: Neil Taylor (Home Ofc.) / Norm (Rep)  
Rep: Lelund Enterprises Chicago, IL 708-430-4777

American Fan Co 2933 Symmes Rd Fairfield, OH 45014  
513-874-2400 800-243-8160 Fax: 513-874-4096  
POC: Mark Fitzgerald

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

Ampco-Pittsburgh Corp/Buffalo Forge Co 490 Broadway PO Box 985  
Buffalo, NY 14240-0985 716-847-5121 Fax: 716-847-7435  
POC: John Nelson (Rep)  
Rep: Leonard G. Hey, Inc. Chicago, IL 708-520-4250

Cook Co 2015 E Dale St PO Box 4047 G S Springfield, MO 65808  
417-869-6474  
POC: Russ Mothersbaugh (Home Ofc.) / Wanda Spadaro (Rep)  
Rep: Marus and Weimer, Inc. Chagrin Falls, OH 216-247-3570

King Co 1001 21st Ave NW PO Box 287 Owatonna, MN 55060  
507-451-3770 Fax: 507-451-3786  
POC: Linden Schewe (Home Ofc.) / Tom (Rep)  
Rep: Gillespe and Associates Mt. Prospect, IL 708-398-1600

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
Carrier Pkwy PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

Western Blower Corp 18625 Railroad Ave City of Industry, CA 91748  
818-964-6425  
POC: George Dunn

#### M11110 - Centrifugal Fans

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

Ampco-Pittsburgh Corp/Bufalo Forge Co 490 Broadway PO Box 985  
Buffalo, NY 14240-0985 716-847-5121 Fax: 716-847-7435  
POC: John Nelson (Rep)  
Rep: Leonard G. Hey, Inc. Chicago, IL 708-520-4250

Carnes Co Inc 448 S Main St Verona, WI 53593  
608-845-6411 Fax: 608-845-6470  
POC: Jeff Lien (Home Ofc.) / Patty King (Rep)  
Rep: S.E. Nelson Co Burke, VA 703-866-0200

Cook Co 2015 E Dale St PO Box 4047 G S Springfield, MO 65808  
417-869-6474  
POC: Russ Mothersbaugh (Home Ofc.) / Wanda Spadaro (Rep)  
Rep: Marus and Weimer, Inc. Chagrin Falls, OH 216-247-3570

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

Western Blower Corp 18625 Railroad Ave City of Industry, CA 91748  
818-964-6425  
POC: George Dunn

#### M11120 - Other Fans

American Coolair Corp 3604 Mayflower St PO Box 2300  
Jacksonville, FL 32203 904-389-3646 Fax: 904-387-3449  
POC: Neil Taylor (Home Ofc.) / Norm (Rep)  
Rep: Lelund Enterprises Chicago, IL 708-430-4777  
Rep2: S.E. Nelson Washington, D.C. 703-866-0200

American Fan Co 2933 Symmes Rd Fairfield, OH 45014  
800-243-8160 Fax: 513-874-4096  
POC: Mark Fitzgerald

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

### **M112XX - Heating Units**

#### **M11200 - Infra-Red Heating Units**

Aitken Products Inc 566 N Eagle St PO Box 151 Geneva, OH 44041  
216-466-5711 Fax: 216-466-5716  
POC: Bob Bucklaew

Cox Manufacturing Co Inc 108 W. 2nd Ridgeville, IN 47380  
317-857-2581 Fax: 317-857-2009  
POC: Jim Garringer

Gas-Fired Products Inc/Space-Ray Div 305 Doggett St PO Box 36485  
Charlotte, NC 28236 704-372-3485 800-438-4936  
Fax: 704-332-5843  
POC: Liz Wooley

Infrared Dynamics 1040 W 17th St Costa Mesa, CA 92627  
714-548-2245 714-548-2244  
POC: Bob Cowan

Willow Manufacturing Inc/Lambert Industries Inc County Road 109  
PO Box 17 Parkville, MN 55773 218-741-1510  
Fax: 218-741-1513  
POC: Steve Hinrichs

#### **M11210 - Make-Up Air Units**

Cambridge Engineering Inc 17825 Chesterfield Airport Rd PO Box 1010  
Chesterfield, MO 63006 314-532-2233 Fax: 314-536-1342  
POC: John Kramer

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones (x333)

Hastings Industries Inc Hastings Industrial Pk E PO Box 548  
Hastings, NE 68901-0548 402-463-9821  
POC: Gary Brooks (Rep) / Dave Cooper (Rep2)  
Rep: Brooks Co Bloomington, IL 309-452-2012  
Rep2: Victor Industrial Corp Warranton, VA 703-347-3008

King Co 1001 21st Ave NW PO Box 287 Owatonna, MN 55060  
507-451-3770 Fax: 507-451-3786  
POC: Linden Schewe (Home Ofc.) / Tom (Rep)  
Rep: Gillespie and Associates Mt. Prospect, IL 708-398-1600

Reed National Corp/Sterling Alton, Applied Air Div 4830 Transport Dr  
Dallas, TX 75247 214-638-6010 Fax: 214-638-2395  
POC: Scott Stallings / Buddy Cross

Reed National Corp/Sterling Radiator Div 260 N Elm St  
Westfield, MA 01085 413-568-9571 Fax: 413-568-9613  
POC: Cliff Greaves (Rep)  
Rep: Cliff Greaves Co Washington, D.C. 919-288-3588

Stamm International Group/Powrmatic Inc 2906 Baltimore Blvd  
Finksburg, MD 21048 301-833-9100 800-966-9100  
Fax: 800-966-7971  
POC: Frank McGready / Melvin Anderson (Pres.)

**M11220 - Space Heaters**

Cambridge Engineering Inc 17825 Chesterfield Airport Rd PO Box 1010  
Chesterfield, MO 63006 314-532-2233 Fax: 314-536-1342  
POC: John Kramer

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones (x333)

Emerson Electric Co/Wiegand Div 641 Alpha Drive Pittsburgh, PA 15238  
412-967-3900  
POC: Gary Ozegovich (Rep)  
Rep: Faber Renoff Washington, D.C. 301-768-4554

Stamm International Group/Powrmatic Inc 2906 Baltimore Blvd  
Finksburg, MD 21048 301-833-9100 800-966-9100  
Fax: 800-966-7971  
POC: Frank McGready / Frank Anderson (Pres.)

**M113XX - Air Conditioning**

**M11300 - \*\* Blank \*\***

**M11310 - Compressors**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Emerson Electric Co/Copeland Corp 1675 W Campbell Rd  
Sidney, OH 45365-0669 513-498-3011  
POC: Joe Lochtefeld

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
Carrier Pkwy PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

Vilter Manufacturing Corp 2217 S 1st St Milwaukee, WI 53207  
414-744-0111 Fax: 414-744-3483  
POC: Gary Meszewski

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

**M11320 - \*\* Blank \*\***

**M11330 - Computer Room, Air Conditioning**

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Contempo Engineering Co 553 Constitution Ave Camarillo, CA 93010  
805-484-7715 Fax: 805-987-4048  
POC: Chuck Thompson

Data Aire Inc 7442 Orangewood Ave Garden Grove, CA 92641  
714-891-3471 Fax: 714-896-0797  
POC: Roland Geldert

Heat Exchangers Inc 8100 N Monticello Ave PO Box 790  
Skokie, IL 60076-3325 708-679-0300 Fax: 708-679-2755  
POC: Joe Pius

Tek Humitrol Inc PO Box 19839 Atlanta, GA 30325 404-355-8563  
Fax: 404-452-0257  
POC: John Peery / Bob Doonan

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

**M11340 - Condensers, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

Amsted Industries Inc/Baltimore Aircoil Co Inc PO Box 7322  
Baltimore, MD 21227 301-799-1300 Fax: 301-799-6416  
POC: Roger Sauter (Rep)  
Rep: A. Lombard and Co Chicago, IL 708-299-8010  
Rep2: G.F. Marin Washington, D.C. 301-953-7770

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler



Ardco Inc/Russell Coil Co 221 S Berry St PO Box 1030  
Brea, CA 92621-1030 714-529-1935 Fax: 714-529-7203  
POC: Bob Wicker

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Emerson Electric Co/Copeland Corp 1675 W Campbell Rd  
Sidney, OH 45365-0669 513-498-3011  
POC: Joe Lochtefeld

Heil-Quaker Corp/Heil Heating and Cooling Products/Zone Aire  
1136 Heil Quaker Blvd PO Box 3005 La Vergne, TN 37086-1985  
615-793-0450 800-447-4700  
POC: Claude Hayes

Hydrotherm Inc Rockland Ave Northvale, NJ 07647  
201-768-5500 Fax: 201-768-3464  
POC: Floyd Lewis / Joe Beshar (V.P.)

Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Sales

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Roberts Associates Washington, D.C. 301-953-9036

Technical Systems Inc PO Box 309 Pryor, OK 74361  
918-825-0720 Fax: 918-825-0723  
POC: Gary Brooks (Rep)  
Rep: Gary Brooks Co Bloomington, IL 309-452-2012

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

Vilter Manufacturing Corp 2217 S 1st St Milwaukee, WI 53207  
414-744-0111 Fax: 414-744-3483  
POC: Gary Meszewski

Wickes Mfg Co, Bohn Heat Transfer Div 1625 E Voorhees St  
Danville, IL 61832 217-446-3710  
POC: Brian Zorns

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

**M11350 - Controls, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd

La Crosse, WI 54601-7599 608-787-2000

POC: Pat Bain (Rep)

Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340

818-896-7443

POC: Ron Winkler

Hydrotherm Inc Rockland Ave Northvale, NJ 07647

201-768-5500 Fax: 201-768-3464

POC: Floyd Lewis / Joe Beshar (V.P.)

York International Corp PO Box 1592 York, PA 17405-1592

717-771-7890

POC: Paul Demeritte (Rep)

Rep: Paul Demeritte 301-792-8181

**M11360 - Cooling Towers, Air Conditioning**

Amsted Industries Inc/Baltimore Aircoil Co Inc PO Box 7322

Baltimore, MD 21227 301-799-1300 Fax: 301-799-6416

POC: Roger Sauter (Rep)

Rep: A. Lombard and Co Chicago, IL 708-299-8010

Rep2: G.F. Marin Co Washington, D.C. 301-953-7770

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340

818-896-7443

POC: Ron Winkler

Evapco Inc 3120 Frederick Ave Baltimore, MD 21229

301-945-3400 Fax: 301-945-2804

POC: Jim Payne

**M11370 - Dehumidifiers, Air Conditioning**

Dumont Industries Main St PO Box 148 Monmouth, ME 04259

207-933-4811 Fax: 207-933-2649

POC: Greg Wilson

MRI 4501 Pulaski Hwy Belcamp, MD 21017

301-575-7600

POC: Mike MacGuire

Tek Humitrol Inc PO Box 19839 Atlanta, GA 30325 404-482-6944

Fax: 404-452-0257

POC: John Peery / Bob Doonan

**M11380 - Evaporators, Air Conditioning**

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340

818-896-7443

POC: Ron Winkler

Evapco Inc 3120 Frederick Ave Baltimore, MD 21229  
301-945-3400 Fax: 301-945-2804  
POC: Jim Payne

Heil-Quaker Corp/Heil Heating and Cooling Products 1136 Heil Quaker Blvd  
PO Box 3005 La Vergne, TN 37086-1985 615-793-0450 800-447-4700  
POC: Claude Hayes

Lintern Corp 8685 Station St PO Box 90 Mentor, OH 44060  
216-255-9333 800-321-3638 Fax: 216-255-6427  
POC: Mike Consider

Reed National Corp/Sterling Alton, Applied Air Division 4830 Transport Dr  
Dallas, TX 75247 214-638-6010  
POC: Scott Stallings / Buddy Cross

Reed National Corp/Sterling Radiator Div 260 N Elm St  
Westfield, MA 01085 413-568-9571 Fax: 413-568-9613  
POC: Cliff Greaves (Rep)  
Rep: Cliff Greaves Co Washington, D.C. 919-288-3588

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

Vilter Manufacturing Corp 2217 S 1st St Milwaukee, WI 53207  
414-744-0111 Fax: 414-744-3483  
POC: Gary Meszewski

**M11390 - Fan Coil, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington D.C. 301-984-2400

Ampco-Pittsburgh Corp/Bufalo Forge Co 490 Broadway PO Box 985  
Buffalo, NY 14240-0985 716-847-5121 Fax: 716-847-7435  
POC: John Nelson (Rep)  
Rep: Leonard G. Hey Inc. Chicago, IL 708-520-4250

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Bard Manufacturing Co 1914 Randolph Dr PO Box 607 Bryan, OH 43506  
419-636-1194 800-537-4595 Fax: 419-636-2640  
POC: Wayne Patten

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Sales

North American Operations Carrier Corp Div, United Technologies  
7310 W Morris St PO Box 70 Indianapolis, IN 46206  
317-243-0851  
POC: John Farrell

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

#### **M114XX - Air Conditioning Cont'd**

##### **M11400 - Heat Pumps, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Bard Manufacturing Co 1914 Randolph Dr PO Box 607 Bryan, OH 43506  
419-636-1194 800-537-4595 Fax: 419-636-2640  
POC: Wayne Patten

Command-Aire Corp PO Box 7916 Waco, TX 76714-7916  
817-840-3244 Fax: 817-840-2639  
POC: Ellen Trick (Home Ofc.) / Jan Clark (Rep) / Randy Hunzeker (Rep2)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400  
Rep2: Trane Commercial Sales and Service Peoria, IL 309-691-4224

Harrow Co/FHP Manufacturing Div 601 NW 65th Court  
Fort Lauderdale, FL 33309 305-776-5471 Fax: 305-776-5476  
POC: Brad Grahl

Heat Exchangers Inc 8100 N Monticello Ave PO Box 790  
Skokie, IL 60076-3325 708-679-0300 Fax: 708-679-2755  
POC: Joe Pius

Heil-Quaker Corp/Heil Heating and Cooling Products 1136 Heil Quaker Blvd  
PO Box 3005 La Vergne, TN 37086-1985 615-793-0450 800-447-4700  
POC: Claude Hayes

Hydrotherm Inc Rockland Ave Northvale, NJ 07647  
201-768-5500 Fax: 201-768-3464  
POC: Floyd Lewis / Joe Beshar (V.P.)

Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Sales

North American Operations Carrier Corp Div, United Technologies  
7310 W Morris St PO Box 70 Indianapolis, IN 46206  
317-243-0851  
POC: John Farrell (315-432-6000)

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

Whalen Co PO Box 1390 Easton, MD 21601  
301-822-9200 Fax: 301-822-8926  
POC: Bruce Whalen

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

**M11410 - Roof Top Units, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Command-Aire Corp PO Box 7916 Waco, TX 76714-7916  
817-840-3244 Fax: 817-840-2639  
POC: Ellen Trick (Home Ofc.) / Jan Clark (Rep) / Randy Hunzeker (Rep2)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400  
Rep2: Trane Commercial Sales and Service Peoria, IL 309-691-4224

Donlee Technologies Inc/York-Shipley Div 693 North Hills Rd  
York, PA 17402-2212 717-755-1081 Fax: 717-755-0020  
POC: Bill Jones (x333)

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Harrow Co/F H P Manufacturing Division 601 NW 65th Court  
Fort Lauderdale, FL 33309 305-776-5471 Fax: 305-776-5476  
POC: Brad Grahl

Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Sales

North American Operations Carrier Corp Div, United Technologies  
7310 W Morris St PO Box 70 Indianapolis, IN 46206  
317-243-0851  
POC: John Farrell (315-432-6000)

Reed National Corp/Sterling Alton, Applied Air Division 4830 Transport Dr  
Dallas, TX 75247 214-638-6010  
POC: Scott Stallings / Buddy Cross

**M11420 - Self-Contained Single Package, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Ardco Inc/Russell Coil Co 221 S Berry St PO Box 1030  
Brea, CA 92621-1030 714-529-1935 Fax: 714-529-7203  
POC: Bob Wicker

Bard Manufacturing Co 1914 Randolph Dr PO Box 607 Bryan, OH 43506  
419-636-1194 800-537-4595 Fax: 419-636-2640  
POC: Wayne Patten

Blaw-Knox Corp/Hupp Co, Typhoon Air Conditioning Div 1135 Ivanhoe Rd  
Cleveland, OH 44110 216-851-6200 Fax: 216-851-6274  
POC: Joe Marino

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Heat Exchangers Inc 8100 N Monticello Ave PO Box 790  
Skokie, IL 60076-3325 708-679-0300 Fax: 708-679-2755  
POC: Joe Pius

Heil-Quaker Corp/Heil Heating and Cooling Products 1136 Heil Quaker Blvd  
PO Box 3005 La Vergne, TN 37086-1985 615-793-0450 800-447-4700  
POC: Claude Hayes

Lennox Industries Inc 2100 Lake Park Blvd Richardson, TX 75080  
214-497-5000 Fax: 214-497-5299  
POC: Sales

Lintern Corp 8685 Station St PO Box 90 Mentor, OH 44060  
216-255-9333 800-321-3638 Fax: 216-255-6427  
POC: Mike Consider

North American Operations Carrier Corp Div, United Technologies  
7310 W Morris St PO Box 70 Indianapolis, IN 46206  
317-243-0851  
POC: John Farrell (315-432-6000)

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

Vilter Manufacturing Corp 2217 S 1st St Milwaukee, WI 53207  
414-744-0111 Fax: 414-744-3483  
POC: Gary Meszewski

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

Zero Corp/Mc Lean Midwest 4000 83rd Ave N  
Brooklyn Park, MN 55443-2594 612-561-9400 800-284-2445  
Fax: 612-569-0533  
POC: Chip Lyon

**M11430 - Water Chillers, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Contempo Engineering Co 553 Constitution Ave Camarillo, CA 93010  
805-484-7715 Fax: 805-987-4048  
POC: Clark Thompson

Data Aire Inc 7442 Orangewood Ave Garden Grove, CA 92641  
714-891-3471 Fax: 714-896-0797  
POC: Roland Geldert

Dunham-Bush Inc/Commercial Products Div 101 Burgess Rd  
Harrisonburg, VA 22801 703-434-0711 Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep: Havtech Columbia, MD 301-621-8383

Heat Exchangers Inc 8100 N Monticello Ave PO Box 790  
Skokie, IL 60076-3325 708-679-0300 Fax: 708-679-2755  
POC: Joe Pius

Pomona Air Inc 1441 E 9th St Pomona, CA 91766  
714-623-6908 Fax: 714-620-6087  
POC: Dan Hobbs (Rep)  
Rep: BTU Corp Oak Brook, IL 708-573-8731

Technical Systems Inc PO Box 309 Pryor, OK 74361  
918-825-0720 Fax: 918-825-0723  
POC: Gary Brooks (Rep)  
Rep: Gary Brooks Co Bloomington, IL 309-452-2012

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

**M11440 - Window Unit, Air Conditioning**

Custom Controls Co PO Drawer 368 Bellaire, TX 77401  
713-666-3258 800-231-3112  
POC: Mark Deschner / Paul Ashcraft

Raytheon Co/Amana Refrigeration Inc, Heating and Cooling Products  
(No Address) Amana, IA 52204 319-622-5511 800-843-0304  
Fax: 319-622-2180  
POC: Sales

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

**M11450 - Air Cleaners, Air Conditioning**

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Bard Manufacturing Co 1914 Randolph Dr PO Box 607 Bryan, OH 43506  
419-636-1194 800-537-4595 Fax: 419-636-2640  
POC: Wayne Patten



Lintern Corp 8685 Station St PO Box 90 Mentor, OH 44060  
216-255-9333 800-321-3638 Fax: 216-255-6427  
POC: Mike Consider

Miller-Picking Corp PO Box 130 Johnstown, PA 15907  
814-479-4023 Fax: 814-479-2469  
POC: Dan Hobbs (Rep)  
Rep: BTU Corp Oak Brook, IL 708-573-8731  
Rep2: Kannapell-Rogers, Inc. Bethesda, MD 301-657-9171

North American Operations Carrier Corp Div, United Technologies  
7310 W Morris St PO Box 70 Indianapolis, IN 46206  
317-243-0851  
POC: John Farrell (315-432-6000)

Snyder General Corp/American Air Filter PO Box 35690  
Louisville, KY 40232-5690 502-637-0011 Fax: 502-637-0351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

Stamm International Group/Powrmatic Inc 2906 Baltimore Blvd  
Finksburg, MD 21048 301-833-9100 800-966-9100  
Fax: 800-966-7971  
POC: Frank McGready / Melvin Anderson (Pres.)

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

**M11460 - Air Handling Units, Air Conditioning**

American-Standard Inc/Trane Co 3600 Pammel Creek Rd  
La Crosse, WI 54601-7599 608-787-2000  
POC: Pat Bain (Rep)  
Rep: Trane Commercial Sales and Service Washington, D.C. 301-984-2400

Ampco-Pittsburgh Corp/Buffalo Forge Co 490 Broadway PO Box 985  
Buffalo, NY 14240-0985 716-847-5121 Fax: 716-847-7435  
POC: John Nelson (Rep)  
Rep: Leonard G. Hey, Inc. Chicago, IL 708-520-4250

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Cook Co 2015 E Dale St PO Box 4047 G S Springfield, MO 65808  
417-869-6474  
POC: Ross Mothersbaugh (Home Ofc.) / Wanda Spadaro (Rep)  
Rep: Marus and Weimer, Inc. Chagrin Falls, OH 216-247-3570

Hastings Industries Inc Hastings Industrial Pk E PO Box 548  
Hastings, NE 68901-0548 402-463-9821  
POC: Gary Brooks (Rep)  
Rep: Brooks Co Bloomington, IL 309-452-2012  
Rep2: Victor Industrial Corp Warranton, VA 703-347-3008

Miller-Picking Corp PO Box 130 Johnstown, PA 15907  
814-479-4023 Fax: 814-479-2469  
POC: Dan Hobbs (Rep)  
Rep: BTU Corp Oak Brook, IL 708-573-8731  
Rep2: Kannapell-Rogers, Inc Bethesda, MD 301-657-9171

Pomona Air Inc 1441 E 9th St Pomona, CA 91766  
714-623-6908 Fax: 714-620-6087  
POC: Dan Hobbs (Rep)  
Rep: BTU Corp Oak Brook, IL 708-573-8731

Snyder General Corp 302 Nichols Dr Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep: John Robert Associates Washington, D.C. 301-953-9036

United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
PO Box 4808 Syracuse, NY 13221 315-432-6000  
POC: John Farrell

York International Corp PO Box 1592 York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep: Paul Demeritte 301-792-8181

**M11470 - Explosionproof Air Conditioning**

The Applied Companies 13834 Del Sur St. San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler

Custom Controls Co PO Drawer 368 Bellaire, TX 77401  
713-666-3258 800-231-3112  
POC: Mark Deschner / Paul Ashcraft

Matticks Industries, Inc. 5904 Jessamine, A-9 Houston, TX 77081  
800-383-8151 Fax: 713-667-9802  
POC: Kevin Matticks/Norman Matticks

## **Appendix C: Derating Factors**

**HVAC:**

50Hz: The output of directly-coupled, motor-driven equipment must be derated to account for the reduction in shaft speed to 5/6 the 60Hz value. Otherwise, the mechanical coupling used between the motor and driven equipment should be purchased to give the required rotating speed. HVAC controls that are frequency dependent must be purchased in 50Hz configurations.

Voltage: Derating for voltage is not an option.

**Electrical Distribution and Protection:****1) Transformers**

50Hz: In general, derating for frequency is not recommended. See Chapter 3 for details.  
Voltage: Derating for voltage is not recommended.  
Vendors can provide almost any needed input voltage rating.  
Consult vendor regarding derating possibility if derating is absolutely necessary.

**2) Power Factor Capacitors**

50Hz: Derate KVAR rating by multiplying 60Hz KVAR rating by 5/6 to yield 50Hz KVAR rating.  
Voltage: Derating for voltage is not recommended.  
Vendors can provide almost any needed voltage rating.  
Consult vendor regarding derating possibility if derating is absolutely necessary.

**3) Protection Equipment**

50Hz: Different trip curves may be needed.  
Consult vendor for these curves.  
Voltage: Derating for voltage should not be needed.  
Verify with vendor since special protection equipment may need derating.

**4) Other Electrical Distribution and Protection**

Derating either cannot or should not be performed.  
Contact vendors listed in Appendix C to purchase appropriately rated equipment.

**Safety and Security Equipment:**

50Hz: Depends on type of power supply.  
Derating is either not necessary or not possible.  
Contact vendor to purchase appropriately-configured power supply.  
Voltage: Derating for voltage is not recommended.  
Contact vendor to purchase appropriately-configured power supply, or  
use transformer to convert supply voltage level to power supply input level.

**Communication Equipment:**

50Hz: Depends on type of power supply.  
Derating is either not necessary or not possible.  
Contact vendor to purchase appropriately-configured power supply.  
Voltage: Derating for voltage is not recommended.  
Contact vendor to purchase appropriately-configured power supply, or  
use transformer to convert supply voltage level to power supply input level.

**Lighting:**

## 1) Incandescent

- 50Hz: No derating necessary - Incandescents are frequency-insensitive.  
Voltage: Not possible. Bulb life will suffer drastically.  
Contact vendors listed in Appendix C to purchase high-voltage bulbs, or use transformer to convert supply voltage to lamp voltage.

## 2) Fluorescent and HID

- 50Hz: Derating is not recommended. Fixtures configured for 50Hz should be purchased.

**Other Electrical Equipment:**

## 1) Motors

- 50Hz: In general, derating a 60Hz motor is not recommended. See Chapter 3 for exceptions.  
Voltage: Derating for voltage is not recommended.  
Contact vendors in Appendix C to purchase appropriately-configured equipment, or use transformer to convert supply voltage to motor's rated voltage level.

## 2) Motor Starters

- 50Hz: Derate by multiplying 60Hz horsepower rating by 4/5 to yield the 50Hz horsepower rating.  
Voltage: Derating for voltage level is not possible.  
Contact vendors in Appendix C to purchase appropriately-configured equipment, or use transformer to convert supply voltage to motor starter's rated voltage level.

## 3) Clocks

- 50Hz: Derating is possible but meaningless since 60Hz clock will not keep correct time in 50Hz environment.  
Contact vendors in Appendix C to purchase 50Hz-rated clocks.  
Voltage: Derating is not recommended.  
Contact vendors in Appendix C to purchase appropriately-configured clocks, or use transformer to convert supply voltage to clock's rated voltage level.

## 4) Computer Power Supplies

- 50Hz: Derating is not possible due to equipment construction.  
Contact vendors in Appendix C to purchase 50Hz-rated equipment.  
Voltage: Derating is not possible.  
Contact vendors in Appendix C to purchase appropriately-configured equipment, or use transformer to convert supply voltage to equipment's rated voltage level.

## **Appendix D: Numerical and Alphabetical Listing of Vendors and Manufacturers**

- ( 1 ) A.B. Chance Co.  
E11830  
210 North Allen Street  
Centralia, MO 65240-1395  
314-682-5521  
POC: Joe Johnson
- ( 2 ) A>B.B Power Transmission and Distribution  
E11530, E11540  
Highway 58 West  
South Boston, VA 24592  
804-575-2211  
{POC: Dick Stoakley
- ( 3 ) A.S.C. Industries Inc./Power Distribution Group  
E11100  
8967 Pleasantwood Avenue N.W.  
P.O. Box 2523  
North Canton, OH 44720-0523  
216-499-1210  
Fax: 216-499-1213  
POC: Mike Rice
- ( 4 ) AMW Industries, Inc.  
M10600  
584 Commerce  
P.O. Box 1364  
Conway, AR 72032  
501-329-9811  
Fax: 501-329-9812  
POC: Sarah Moncada  
Rep #1: (Wash., D.C.) Sam Desanto 301-881-8848
- ( 5 ) Acme Electric/Acme Transformer Division  
E11500, E11510, E11520  
4815 West 5th Street  
Lumberton, NC 28358  
919-738-1121  
Fax: 919-739-0024  
POC: Patti Grimmet  
Rep #1: Electri Agency Inc. Elk Grove, IL 708/439-5030
- ( 6 ) Airmaster Fan Co  
M11100  
150 W North St  
PO Box 968  
Jackson, MI 49204-0968  
517-764-2300 800-255-3084

Fax: 517-787-3336

POC: Sales

( 7 ) Aitken Products Inc

M11200

566 N Eagle St

PO Box 151

Geneva, OH 44041

216-466-5711

Fax: 216-466-5716

POC: Bob Bucklaew

( 8 ) Ajax Boiler Inc

M10220, M10230

17700 S. Main St

Gardena, CA 90248

213-321-2815

POC: Larry Miracle

( 9 ) Aldrich Co

M10100, M10120, M10220, M10230

341 E Williams St

PO Box 97

Wyoming, IL 61491-0097

309-695-2311

Fax: 309-695-5779

POC: Ned Howard

( 10 ) American Coolair Corp

M11100, M11120

3604 Mayflower St

PO Box 2300

Jacksonville, FL 32203

904-389-3646 Fax: 904-387-3449

POC: Neil Taylor (Home Ofc.) / Norm (Rep)

Rep #1: Lelund Enterprises Chicago, IL 708-430-4777

( 11 ) American Fan Co

M11100, M11120

2933 Symmes Rd

Fairfield, OH 45014

513-874-2400 800-243-8160

Fax: 513-874-4096

POC: Mark Fitzgerald

( 12 ) American-Standard Inc/Trane Co

M10400, M10410, M11100, M11110, M11310, M11340, M11350,

M11390, M11400, M11410, M11420, M11430, M11460

3600 Pammel Creek Rd

La Crosse, WI 54601-7599

608-787-2000



POC: Pat Bain (Rep)

Rep #1: Trane Commercial Sales and Service 301-984-2400

- ( 13 ) Ampco-Pittsburgh Corp/Buffalo Forge Co  
M11100, M11110, M11390, M11460  
490 Broadway  
PO Box 985  
Buffalo, NY 14240-0985  
716-847-5121 Fax: 716-847-7435  
POC: John Nelson (Rep)  
Rep #1: Leonard G. Hey, Inc. Chicago, IL 708-520-4250

- ( 14 ) Amsted Industries Inc/Baltimore Aircoil Co Inc  
M10900, M11340, M11360  
PO Box 7322  
Baltimore, MD 21227  
301-799-1300  
Fax: 301-799-6416  
POC: Roger Sauter (Rep)  
Rep #1: A. Lombard and Co. (Illinois) 708-299-8010

- ( 15 ) Appleton Electric Co.  
E10420, E10430, E10440, E10450, E10600,  
E10610, E10620, E11000, E12100, E12110, E12120, E12130  
1701 W. Wellington Ave.  
Chicago, IL 60657  
312-327-7200  
Fax: 312-975-6349  
POC: Terese McGary

- ( 16 ) Ardco Inc/Russell Coil Co  
M11340, M11420  
221 S Berry St  
PO Box 1030  
Brea, CA 92621-1030  
714-529-1935  
Fax: 714-529-7203  
POC: Bob Wicker

- ( 17 ) Asco Controls/Automatic Switch Company  
E11800, E11810  
50-60 Hanover Road  
Florham Park, NJ 07932  
201-966-2000  
Fax: 201-966-2628  
POC: Henry Dacko  
Rep #1: Automatic Switch Company Elk Grove, IL 708/640-3450

- ( 18 ) Automatic Timing and Controls  
E10480  
959 Cheney Ave.  
Marion, OH 43302  
614-387-8827  
Fax: 614-382-9080

POC: Ron Maul

- ( 19 ) Bard Manufacturing Co  
M11390, M11400, M11420, M11450  
1914 Randolph Dr  
PO Box 607  
Bryan, OH 43506  
419-636-1194 800-537-4595  
Fax: 419-636-2640  
POC: Wayne Patten
- ( 20 ) Beckwith Electric Co. Inc.  
E10460  
P.O. Box 2999  
Largo, FL 34649-2999  
813-535-3408  
Fax: 813-546-0121  
POC: Jim Harlow
- ( 21 ) Blaw-Knox Corp/Hupp Co, Typhoon Air Conditioning Div  
M10410, M11420  
1135 Ivanhoe Rd  
Cleveland, OH 44110  
216-851-6200  
Fax: 216-851-6274  
POC: Joe Marino (x394)
- ( 22 ) Bogue Electric Manufacturing Co.  
E11400, E11820  
100 Pennsylvania Avenue  
Paterson, NJ 07509  
201-523-2200  
Fax: 201-279-2973  
POC: Joseph DeCeglia
- ( 23 ) Boltswitch Inc.  
E10430, E10440, E10450, E10470, E10480  
6107 W. Lou Avenue  
Crystal Lake, IL 60014  
815-459-6900  
Fax: 815-455-7788  
POC: Dick Rahn
- ( 24 ) Bridges Electric Inc.  
E10430, E11830  
Industrial Park Hwy. 110 East  
P.O. Box 511  
Heber, AR 72543  
501-362-8296  
Fax: 501-362-6970  
POC: John Jones

- ( 25 ) Bryan Steam Corp  
M10000, M10200, M10230  
PO Box 27  
Peru, IN 46970  
317-473-6651  
Fax: 317-473-3074  
POC: Bob Warren  
Rep #1: Cummings-Wagner Annapolis, MD 301-490-9007
- ( 26 ) Burle Industries Inc./Security Products  
E12400, E12420  
1000 New Holland Avenue  
Lancaster, PA 17601-5688  
717-295-6123  
Fax: 717-295-6097  
POC: Steve Neil
- ( 27 ) Cambridge Engineering Inc  
M11210, M11220  
17825 Chesterfield  
Airport Rd  
PO Box 1010  
Chesterfield, MO 63006  
Fax: 314-536-1342  
POC: John Kramer
- ( 28 ) Carnes Co Inc  
M11000, M11110  
448 S Main St  
Verona, WI 53593  
608-845-6411  
Fax: 608-845-6470  
POC: Jeff Lien (Home Ofc.) / Patty King (Rep)  
Rep #1: S.E. Nelson Co Barke, VA 703-866-0200
- ( 29 ) Caterpillar Inc.  
E11800, E11810, E11820  
100 N.E. Adams Street  
Peoria, IL 61629  
309-675-1000  
Fax: 309-675-6155  
POC: Bob Kilper
- ( 30 ) Central Vac International Incorporated  
M10520  
3133 East 12th Street  
Los Angeles, CA 90023  
213-268-1135  
Fax: 213-268-9684  
POC: George Crossman

- ( 31 ) Challenger Electrical Equipment Corp.  
E10430, E10440, E10450, E10470, E10600, E10610, E10620,  
E10900, E11000, E11100, E11200, E11210, E11220, E11230,  
E11500, E11510, E11520, E11530, E11840  
508 Lapp Road  
Malvern, PA 19355  
215-647-5000  
Fax: 215-640-0568  
POC: Rose Harris  
Rep #1: Challenger Electrical Elk Grove Village, IL 708-595-3840
- ( 32 ) Chloride Systems/Lighting Alliance  
E12000, E12010, E12020, E12030, E12040  
4415 West Harrison Street  
Suite 234  
Hillside, IL 60162  
708-449-8822  
Fax: 708-449-8835  
POC: Ed Vormann
- ( 33 ) Cincinatti Fan Co.  
M11120  
7697 Snider Road  
Mason, OH 45040  
800-628-1200  
POC: Donna Crews  
Rep #1: R.R. Floody Inc. Rockford, IL 815-399-1931
- ( 34 ) Clarkson Industries Inc/Hoffman Air and Filtration Systems Div.  
M10520  
PO Box 548  
East Syracuse, NY 13057-0548  
315-437-0311 800-258-8088  
Fax: 315-432-8682  
POC: Carl Wuerslin (Home Ofc.) / Ed Orndoff (Rep)  
Rep #1: Neo Associates 717-359-9800
- ( 35 ) Coates Heater Co Inc  
M10000  
18250 68th Ave S  
Kent, WA 98032  
206-872-7256  
Fax: 206-251-0830  
POC: Bob Wisenburg

- ( 36 ) Columbia Boiler Co Of Pottstown  
M10220, M10230  
PO Box G  
Pottstown, PA 19464  
215-323-2700  
POC: Barry Loar
- ( 37 ) Comdial Corporation  
E12740  
1180 Seminole Trail  
Charlottesville, VA 22906  
800/347-1432  
Fax: 804/978-2293  
POC: Frank Feliciano
- ( 38 ) Command-Aire Corp  
M10410, M11400, M11410  
PO Box 7916  
Waco, TX 76714-7916  
817-840-3244  
Fax: 817-840-2639  
POC: Ellen Trick (Home Ofc.) / Jan Clark (Rep)  
Rep #1: (Wash., D.C.) 301-984-2400
- ( 39 ) Computer Power Inc.  
E11700, E11710, E11720, E11730, E11740  
124 West Main Street  
High Bridge, NJ 08829  
908-638-8000  
Fax: 908-638-4931  
POC: Tom Schreffler
- ( 40 ) Contempo Engineering Co  
M11330, M11430  
553 Constitution Ave  
Camarillo, CA 93010  
805-484-7715  
Fax: 805-987-4048  
POC: Chuck Thompson
- ( 41 ) Controlled Power Co.  
E11710, E11720, E11730, E11740  
1955 Stephenson Highway  
Troy, MI 48083  
313-528-3700  
Fax: 313-528-0411  
POC: Ed Reschka

- ( 42 ) Cook Co  
M11100, M11110, M11460  
2015 E Dale St  
PO Box 4047 G S  
Springfield, MO 65808  
417-869-6474  
POC: Russ Mothersbaugh (Home Ofc.) / Wanda Spadaro (Rep)  
Rep #1: Marus and Weimer, Inc. Chagrin Falls, OH 216-247-3570
- ( 43 ) Cooper Industries Inc./Arrow-Hart Component Products Division  
E10400, E10410  
103 Hawthorn Street  
Hartford, CT 06105  
203-249-8471  
POC: Kathy Krol  
Rep #1: Eaton Corporation Milwaukee, WI 414-449-7780
- ( 44 ) Cooper Industries Inc./Crouse-Hinds Electrical Construction Materials  
E10600, E10610, E10620, E11000, E11100, E12100, E12110,  
E12120, E12130, E12410  
Wolf and 7th North Streets  
P.O. Box 4999  
Syracuse, NY 13221  
315-477-7000  
Fax: 315-477-5717  
POC: Carol Messinger
- ( 45 ) Cooper Industries/Cooper Power Systems/McGraw-Edison Power Systems  
E10700, E10710, E11900  
P.O. Box 2850  
Pittsburgh, PA 15230  
412-269-6700  
Fax: 412-269-6761  
POC: Gary Patterson  
Rep #1: Vikeland Sales Inc. Addison, IL 708-832-8425
- ( 46 ) Coppus Engineering Corp/Kewanee Boiler Co Inc  
M10210, M10220, M10230  
101 Franklin St  
Kewanee, IL 61443  
309-853-3541  
Fax: 309-852-3541  
POC: Rod Young  
Rep #1: Fairbanks and Associates Arlington, VA 703-931-1313
- ( 47 ) Corbett Lighting Inc.  
E12100, E12120  
2727 Northhaven Road  
Dallas, TX 75229  
214-241-8800  
Fax: 214-241-4239  
POC: Dave Meyer  
Rep #1: Total Lighting Concepts Hillside, IL 708-449-2022

( 48 ) Cornerstone Direct Corp./Ready Made Sign Co. Inc.  
E12000, E12010, E12020, E12030, E12040  
480 Fillmore Ave.  
Tonawanda, NY 14151  
716-695-7300  
Fax: 800-222-1934  
POC: Dan Howes

( 49 ) Cortelco Inc./I.T.T. Telephones  
E12740  
Fulton Drive  
Corinth, MS 38834  
601/287-5281  
Fax: 601/287-1473  
POC: Mark Daniel

( 50 ) Cox Manufacturing Co Inc  
M11200  
108 W. 2nd  
Ridgeville, IN 47380  
317-857-2581  
Fax: 317-857-2009  
POC: Jim Garringer

( 51 ) Cresswood Industrial Furnaces  
E11820, M10210  
4504-T Ellwalk Ave.  
Cortland, IL 60112  
800-962-7302 Ext. 71  
POC: Larry Reiling

( 52 ) Crown Industries Inc  
M10220, M10230  
3633 I St  
Philadelphia, PA 19134  
215-535-8900  
Fax: 215-535-9736  
POC: Paul Sohler

( 53 ) Custom Controls Co  
M11440, M11470  
PO Drawer 368  
Bellaire, TX 77401  
713-666-3258 800-231-3112  
POC: Mark Deschner / Paul Ashcraft

( 54 ) Cyberex Inc.  
E11800, E11810  
7171 Industrial Park Blvd.  
Mentor, OH 44060  
216-946-1783  
Fax: 216-946-5963  
POC: Ed Meluch

- ( 55 ) Data Aire Inc  
M11330, M11430  
7442 Oranewood Ave  
Garden Grove, CA 92641  
714-891-3471  
Fax: 714-896-0797  
POC: Roland Geldert
- ( 56 ) Detection Systems Inc.  
E12400, E12900, E12910  
130 Perinton Parkway  
Fairport, NY 14450  
716-223-4060  
Fax: 716-223-9180  
POC: Jeff Matrachisia
- ( 57 ) Donlee Technologies Inc./York-Shipley Div  
M10220, M10230, M10400, M10910, M11210, M11220, M11410  
693 North Hills Rd  
York, PA 17402-2212  
717-755-1081  
Fax: 717-755-0020  
POC: Bill Jones (x333)
- ( 58 ) Dresser Rand Co./Steam Turbine, Motor and Generator Division  
E11820  
800 Central Avenue  
Minneapolis, MN 55413-2403  
612-378-8000  
Fax: 612-378-8050  
POC: Tim Spence
- ( 59 ) Dual-Lite Inc.  
E12000, E12010, E12020, E12030, E12040  
Simm Lane  
P.O. Box 468  
Newtown, CT 06470  
203-426-8011  
Fax: 203-426-7486  
POC: Patti Grimmet  
Rep #1: Electri Agency Inc. Elk Grove, IL 708-439-5030
- ( 60 ) Dumont Industries  
M10000, M11370  
Main St  
PO Box 148  
Monmouth, ME 04259  
207-933-4811  
Fax: 207-933-2649  
POC: Greg Wilson



- ( 61 ) Dunham-Bush Inc/Commercial Products Div  
M10220, M10230, M10900, M11340, M11390, M11410, M11420, M11430  
101 Burgess Rd  
Harrisonburg, VA 22801  
703-434-0711  
Fax: 703-434-4010  
POC: Jim McLarty (Rep)  
Rep #1: Havtech Columbia, MD 301-621-8383
- ( 62 ) Durham Company  
E10900, E11230  
P.O. Box 908  
Lebanon, MO 65536  
417-532-7121  
Fax: 417-532-2366  
POC: John Chastain
- ( 63 ) ESSEF Industries Inc/Pac-Fab Inc  
M10020  
1620 Hawkins Ave  
Sanford, NC 27330  
919-774-4151 800-833-3692  
Fax: 919-774-4841  
POC: Doug Stout
- ( 64 ) Eagle Electric Manufacturing Co. Inc.  
E10400, E10410, E10440, E10450, E10700, E10710  
45-31 Court Square  
Long Island City, NY 11101  
718-937-8000  
Fax: 718-482-0160  
POC: Harlan Berman
- ( 65 ) Electric Heater Co.  
M10000  
45 Seymour St  
PO Box 288  
Stratford, CT 06497-0288  
203-378-2659  
Fax: 203-378-3593  
POC: Bill Newbauer, Jr.
- ( 66 ) Electric Time Co. Inc.  
E12300  
45 West Street  
Medfield, MA 02052  
508-359-4396  
Fax: 508-359-4482  
POC: Tom Erb

- ( 67 ) Emerson Electric Co/Copeland Corp  
M11310, M11340  
1675 W Campbell Rd  
Sidney, OH 45365-0669  
513-498-3011  
POC: Joe Lochtefeld
- ( 68 ) Emerson Electric Co/Wiegand Div  
M10300, M11220  
641 Alpha Drive  
Pittsburgh, PA 15238  
412-967-3900  
POC: Gary Ozegovich (Rep)  
Rep #1: Faber-Renoff Baltimore, MD 301-768-4554
- ( 69 ) Evapco Inc  
M11360, M11380  
3120 Frederick Ave  
Baltimore, MD 21229  
301-945-3400  
Fax: 301-945-2804  
POC: Jim Payne
- ( 70 ) Fire-Lite Alarms Inc.  
E12900, E12910  
12 Clintonville Road  
Northford, CT 06472  
203/484-7161  
Fax: 203/484-7118  
POC: Ray Weymann
- ( 71 ) Gas-Fired Products Inc/Space-Ray Div  
M11200  
305 Doggett St  
PO Box 36485  
Charlotte, NC 28236  
704-372-3485 800-438-4936  
Fax: 704-332-5843  
POC: Liz Wooley
- ( 72 ) General Electric Co./Industry Sales and Services Division  
E11840, E11900  
1 River Road  
Schenectady, NY 12345  
518-385-2211  
POC: Warren Molitor  
Rep #1: General Electric Co., Bloomington, IL 309-664-1474

- ( 73 ) General Electric Company  
E10900, E11000, E11100, E11200, E11210, E11220, E11230, E11300,  
E11310, E11320, E11500, E11510, E11520  
41 Woodford Avenue  
Plainville, CT 06062  
POC: Warren Molitor  
Rep #1: General Electric Co. Bloomington, IL 309-664-1474
- ( 74 ) General Signal Corp/Aurora Pump  
M10600  
800 Airport Rd.  
North Aurora, IL 60542  
708-859-7000  
Fax: 708-859-7000  
POC: Shirley Fezekas (Home Ofc.) / David (Rep)  
Rep #1: General Pump and Machine Peoria, IL 309-693-7444
- ( 75 ) General Signal Corporation/Sola Division  
E11700  
1717 Busse Road  
Elk Grove Village, IL 60007  
708-439-2800  
Fax: 708/439-1160  
POC: Tom McCaughn
- ( 76 ) Genlyte Group Inc/Imperial Bronzelite  
M10010  
500 Wonder World Dr  
PO Box 606  
San Marcos, TX 78666  
512-392-5821 512-392-8957  
Fax: 512-353-5822  
POC: Clark Douglas
- ( 77 ) HB Instrument Co.  
E10460  
104 W. Seventh Ave  
Trappe, PA 19426-0770  
215-489-5504  
Fax: 800-HB1-FAX2  
POC: Ed Hergesel
- ( 78 ) Harrow Co/FHP Manufacturing Division  
M11400, M11410  
601 NW 65th Court  
Fort Lauderdale, FL 33309  
305-776-5471  
Fax: 305-776-5476  
POC: Brad Grahl

- ( 80 ) Hastings Industries Inc  
M10300, M10410, M10910, M11210, M11460  
Hastings Industrial Pk E  
PO Box 548  
Hastings, NE 68901-0548  
402-463-9821  
POC: Gary Brooks (Rep)  
Rep #1: Brooks Co Bloomington, IL 309-452-2012
- ( 81 ) Heat Exchangers Inc  
M11330, M11400, M11420, M11430  
8100 N Monticello Ave  
PO Box 790  
Skokie, IL 60076-3325  
708-679-0300  
Fax: 708-679-2755  
POC: Joe Pius
- ( 82 ) Heil-Quaker Corp/Heil Heating and Cooling Products  
M11380, M11400, M11420  
1136 Heil Quaker Blvd  
PO Box 3005  
La Vergne, TN 37086-1985  
615-793-0450 800-447-4700  
POC: Claude Hayes
- ( 83 ) Heil-Quaker Corp/Heil Heating and Cooling Products/Zone Aire  
M11340  
1136 Heil Quaker Blvd  
PO Box 3005  
La Vergne, TN 37086-1985  
615-793-0450 800-447-4700  
POC: Claude Hayes
- ( 84 ) Heil-Quaker Corp/Tempstar Heating and Cooling Products  
M10410  
1136 Heil Quaker Blvd  
PO Box 3005  
La Vergne, TN 37086-1985  
615-793-0450 800-447-2882  
POC: Claude Hayes
- ( 85 ) Hydrotherm Inc  
E10420, M10220, M10230, M11340, M11350, M11400  
Rockland Ave  
Northvale, NJ 07647  
201-768-5500  
Fax: 201-768-3464  
POC: Floyd Lewis / Joe Beshar (V.P.)

- ( 86 ) Industrial Boiler Company Inc.  
M10210  
P.O. Drawer 2258  
Thomasville, GA 31792  
Fax: 912-226-3027  
POC: Mark Nesmith
- ( 87 ) Infrared Dynamics  
M11200  
1040 W 17th St  
Costa Mesa, CA 92627  
714-548-2245 714-548-2244  
POC: Bob Cowan
- ( 88 ) International Configurations Inc.  
E13000, E13010  
P.O. Box 3374  
Enfield , CT 06082  
203-749-6380  
Fax: 203-749-2985  
POC: Harold Mitchell
- ( 89 ) Janco Corporation  
E10420  
3111-T Winona Avenue  
Burbank, CA 91504  
818-846-1800  
Fax: 818-842-3396  
POC: Paul Gerritse
- ( 90 ) King Co  
M11100, M11210  
1001 21st Ave NW  
PO Box 287  
Owatonna, MN 55060  
507-451-3770  
Fax: 507-451-3786  
POC: Linden Schewe (Home Ofc.) / Tom (Rep)  
Rep #1: Gillespe and Associates Mt. Prospect, IL 708-398-1600
- ( 91 ) Lapp Insulator Co./Power Structures Inc.  
E11830  
P.O. Box 6261  
New Orleans, LA 70174  
504-394-7433  
Fax: 504-391-9692  
POC: Pat Deloney

- ( 92 ) Lennox Industries Inc  
M10400, M10410, M11340, M11390, M11400, M11410, M11420  
2100 Lake Park Blvd  
Richardson, TX 75080  
214-497-5000  
Fax: 214-497-5299  
POC: Steve / Tony
- ( 93 ) Lindsey Manufacturing Co.  
E11830  
760 North Georgia Avenue  
Azusa, CA 91702  
818-969-3471  
Fax: 818-969-3177  
POC: Jiji Smith
- ( 94 ) Lintem Corp  
E11830, M11380, M11420, M11450  
8685 Station St  
PO Box 90  
Mentor, OH 44060  
216-255-9333 800-321-3638  
Fax: 216-255-6427  
POC: Mike Consider
- ( 95 ) Little Giant Manufacturing Co Inc  
M10000  
907 7th St  
PO Box 518  
Orange, TX 77630  
409-883-4246 800-231-6035  
POC: Alan McCorquodale
- ( 96 ) Lochinvar Corp  
M10000, M10100, M10110, M10120, M10200, M10230  
2005 Elm Hill Park  
Nashville, TN 37210  
615-889-8900  
Fax: 615-885-4403  
POC: Scott Armstrong
- ( 97 ) Lumark Lighting/Cooper Lighting  
E12110, E12130  
400 Busse Road  
Elk Grove Village, IL 60007  
312-956-8400  
Fax: 312-956-1537  
POC: James Byrket  
Rep #1: Westinghouse Supply Co. Danville, IL 217-442-1901

## ( 98 ) MRI

M11370  
4501 Pulaski Hwy  
Belcamp, MD 21017  
301-575-7600  
POC: Mike MacGuire

## ( 99 ) Marathon Electric

E10420, E11400  
100 E. Randolph St.  
Wausau, WI 54401  
715-675-3311  
Fax: 715-675-6361  
POC: Shelley Thompson

## ( 100 ) Marley Co/Weil-Mc Lain

M10200, M10220, M10230  
Blaine St  
Michigan City, IN 46360  
219-879-6561  
POC: Jim Wells / Jim Platt

## ( 101 ) Marley Pump Co/Red Jacket Pumps Div

M10600  
5800 Fox Ridge Dr  
Mission, KS 66202  
913-831-5700 800-468-7867  
Fax: 913-831-5145  
POC: Kay Poirier

## ( 102 ) Matticks Industries, Inc.

M11470  
5904 Jessamine, A-9  
Houston, TX 77081  
800-383-8151  
Fax: 713-667-9802  
POC: Kevin Matticks/Norman Matticks

## ( 103 ) Maytag Company

M10500, M10510  
1 Dependability Square  
Newton, IA 50208  
515-792-7000  
Fax: 515-791-8395  
POC: Tom Weeks

## ( 104 ) Micro Switch/Honeywell Division

E10420  
11 West Spring Street  
Freeport, IL 61032  
815-235-6600  
Fax: 815-235-6545  
POC: Dave Hill

## ( 105 ) Miller-Picking Corp

M11450, M11460  
PO Box 130  
Johnstown, PA 15907  
814-479-4023  
Fax: 814-479-2469  
POC: Dan Hobbs (Rep)  
Rep #1: BTU Corp Oak Brook, IL 708-573-8731  
Rep #2: Kannapell-Rogers, Inc. Bethesda, MD 301-657-9171

## ( 106 ) Monaco Enterprises Inc.

E12400, E12410, E12900  
East 14820 Sprague Avenue  
Spokane, WA 99214-0129  
509-926-6277  
Fax: 509-924-4980  
POC: Dan Long

## ( 107 ) Mor-Flo Industries Inc/American Appliance Manufacturing Corp

M10100, M10110  
PO Box 1956  
Santa Monica, CA 90406  
213-829-1755  
Fax: 213-828-1940  
POC: Jim Yerman

## ( 108 ) Motorola Inc.

E12740  
1475 West Shure Drive  
Arlington Heights, IL 60004  
708-632-5000  
Fax: 708-632-6034  
POC: Marge Seda

## ( 109 ) Niagra Transformer Corp.

E11530, E11540  
1751 Dale Road  
Buffalo, NY 14225  
716-896-6500  
Fax: 716-896-8871  
POC: Bill Hanavan



## ( 110 ) North American Operations Carrier Corp Div, United Technologies

M11390, M11400, M11410, M11420, M11450

7310 W Morris St

PO Box 70

Indianapolis, IN 46206

317-243-0851

POC: John Farrell

## ( 111 ) Nu Tone Inc.

E12300, E12410, E12420, E12710, E12720

Madison and Red Bank Roads

Cincinnati, OH 45227

513-527-5100

POC: Mike Walsh

## ( 112 ) Paddock Pool Equipment Co Inc

M10010, M10020

555 Paddock Pkwy

PO Box 11676

Rock Hill, SC 29730

803-324-1111

Fax: 803-324-1116

POC: Eddie Graves

## ( 113 ) Panel Components Corp.

E13000, E13010

P.O. Drawer 6626

Santa Rosa, CA 95406

707-534-0600

Fax: 707-578-5478

POC: Kim Eades

## ( 114 ) Parker Boiler Co

M10230

5930 Bandini Blvd

Los Angeles, CA 90040-2999

213-727-9800

Fax: 213-722-2848

POC: Martin Bender / Greg Danenhauer

## ( 115 ) Paso Sound Products Inc.

E12700, E12710, E12720, E12730

14 First Street

Pelham, NY 10803-1495

914-738-4800

Fax: 914-738-3954

POC: Ken O'Brien

- ( 116 ) Pass and Seymour/Legrand  
E1300, E13010  
344 Carol Lane  
Elmhurst, IL 60126  
708-832-2500  
Fax: 708-323-2524  
POC: Jim Knapi
- ( 117 ) Peerless Pump  
M10600  
1200 Sycamore St.  
Montebello, Ca 90640  
213-726-1232  
POC: Tom Martin (Chicago Ofc - 708-298-2616)
- ( 118 ) Pittway Corporation/Ademco Division  
E12400, E12410, E12900, E12910  
180 Michael Drive  
Syosset, NY 11791  
516-921-6700  
Fax: 516-921-6700  
POC: Tony Franco
- ( 119 ) Pittway Corporation/Notifier Division  
E12900, E12910  
12 Clintonville Road  
Northford, CT 06472  
800-289-3473  
Fax: 203-484-7118  
POC: Ray Weymann
- ( 120 ) Pomona Air Inc  
M11430, M11460  
1441 E 9th St  
Pomona, CA 91766  
714-623-6908  
Fax: 714-620-6087  
POC: Dan Hobbs (Rep)  
Rep #1: BTU Corp Oak Brook, IL 708-573-8731
- ( 121 ) Precision Parts Corp  
M10200, M10230  
4340 E Main St  
PO Box 2159  
Morristown, TN 37814  
615-587-9390  
Fax: 615-581-7749  
POC: Mark Cole

- ( 122 ) Prescolite/U.S.I. Lighting  
E12100, E12110, E12120, E12130  
1251 Doolittle Drive  
San Leandro, CA 94577  
415-562-3500  
POC: Mark Benguerel
- ( 123 ) Racon Incorporated  
E12400  
12628 Interurban Avenue South  
Seattle, WA 98168  
206-241-1110  
Fax: 206-246-9306  
POC: Tim Tewey
- ( 124 ) Rapid Power Technologies Inc.  
E11710, E11720, E11730, E11740  
Graysbridge Road  
Brookfield, CT 06804  
203-775-0411  
Fax: 203-775-0666  
POC: Fred Eigenrauch
- ( 125 ) Rauland-Borg Corp.  
E12700, E12710, E12720, E12730  
3450 West Oakton Street  
Skokie, IL 60076-2951  
708-679-0900  
Fax: 708-679-0625  
POC: Bill Martin  
Rep #1: Life Safety Design Danville, IL 217/446-2564
- ( 126 ) Raytheon Co/Amana Refrigeration Inc, Heating and Cooling Products  
M11440  
(No Address)  
Amana, IA 52204  
319-622-5511 800-843-0304  
Fax: 319-622-2180  
POC: Sales
- ( 127 ) Reed National Corp/Sterling Alton, Applied Air Div  
M10400, M10410, M11210  
4830 Transport Dr  
Dallas, TX 75247  
214-638-6010 Fax: 214-638-2395  
POC: Scott Stallings / Buddy Cross

- ( 128 ) Reed National Corp/Sterling Alton, Applied Air Division  
M11210  
4830 Transport Dr  
Dallas, TX 75247  
214-638-6010  
POC: Scott Stallings / Buddy Cross
- ( 129 ) Reed National Corp/Sterling Radiator Div  
M10300, M10400, M11210, M11380  
260 N Elm St  
Westfield, MA 01085  
413-568-9571  
Fax: 413-568-9613  
POC: Cliff Greaves (Rep)  
Rep #1: Cliff Greaves Co Washington, D.C. 919-288-3588
- ( 130 ) Reliance Electric Co.  
E11400  
24701 Euclid Ave.  
Cleveland, OH 44117  
216-266-7000  
POC: Jim Bowers
- ( 131 ) Reliance Electric Co./Kato Engineering Co.  
E1170  
2075 Howard Drive  
Mankato, MN 56001  
507-625-4011  
Fax: 507-345-2798  
POC: Larry Sieberg
- ( 132 ) Rheem Manufacturing Co/Ruud Water Heater Div  
M10100, M10110  
5780 Peachtree-Dunwoody Road NE  
Atlanta, GA 30342  
205-260-1500 800-432-8373  
POC: Russel Maddox / Roger Clark
- ( 133 ) Rupp Industries Inc  
M10910  
11550 Rupp Dr  
Burnsville, MN 55337  
612-894-3000 800-231-1882  
Fax: 612-894-7877  
POC: Terry Heer
- ( 134 ) S and C Electric Co.  
E10700, E10710  
6601 North Ridge Boulevard  
Chicago, IL 60626  
312-338-1000  
POC: Bob Tucker  
Rep #1: S and C Electric Co. St. Louis, MO 314/997-6440

## ( 135 ) Sequoia Vacuum Systems Incorporated

M10520  
164 Jefferson Drive  
Menlo Park, CA 94025  
415-322-7281  
Fax: 415-322-8745  
POC: Mike White

## ( 136 ) Siebring Manufacturing Inc/Siebring Battery Div

M10400  
PO Box 658  
George, IA 51237  
712-475-3317 Fax: 712-475-3490  
POC: Linden Hass

## ( 137 ) Simplex Time Recorder Co.

E12300  
Simplex Plaza  
Gardner, MA 01441-0001  
508-632-2500  
POC: Dave Ringland  
Rep #1: Simplex Time Recorder Co. East Peoria, IL 309/694-8000

## ( 138 ) Skutle Manufacturing Co

M11000  
Route 10  
Marietta, OH 45750  
614-373-9169 800-848-9786  
Fax: 614-373-9565  
POC: Earl Lewis, Jr.

## ( 139 ) Smith Corp/Smith Water Products Co

M10000, M10100, M10110, M10120, M10230  
5605 Mac Arthur Blvd Suite 360  
Irving, TX 75038  
214-518-1990 800-527-1953  
Fax: 214-518-1736  
POC: Paul Woodward

## ( 140 ) Snyder General Corp

M11340, M11380, M11400, M11420, M11460  
302 Nichols Dr  
Hutchins, TX 75141  
214-225-7351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep #1: John Robert Associates Washington, D.C. 301-953-9036

- ( 141 ) Snyder General Corp/American Air Filter  
M11450  
PO Box 35690  
Louisville, KY 40232-5690  
502-637-0011  
Fax: 502-637-0351  
POC: Rich Huber (Rep) / Tom Donovan (Rep)  
Rep #1: John Robert Associates Washington, D.C. 301-953-9036
- ( 142 ) Speed Queen Co.  
M10510  
Shepard St.  
PO Box 990  
Ripon, WI 54971-0990  
414-748-3121  
POC: Mike Besaw
- ( 143 ) Square D Co./Consumer Products Division  
E10400, E10420, E10450, E10480, E10710, E11100, E11200, E11210,  
E11220, E11230, E11300, E11310, E11320, E11500, E11510  
1870 Roselle Road  
Hillcrest Commons  
Schaumburg, IL 60195  
708-397-9559  
Fax: 708-397-8814  
POC: Doug Atkinson  
Rep #1: Square D Company Champaign, IL 217/356-0211
- ( 144 ) Square D Co./Distribution Equipment Division  
E11840  
1601 Mercer Road  
Lexington, KY 40511  
606-254-6412  
POC: Doug Atkinson  
Rep #1: Square D Company Champaign, IL 217/356-0211
- ( 145 ) Stamm International Group/Powrmatic Inc  
M10300, M11210, M11450  
2906 Baltimore Blvd  
Finksburg, MD 21048  
301-833-9100 800-966-9100  
Fax: 800-966-7971  
POC: Frank McGready / Melvin Anderson (Pres.)
- ( 146 ) State Industries Inc  
M10100, M10110  
500 By-Pass Rd  
Ashland City, TN 37015  
615-792-4371 800-365-0024  
Fax: 800-365-FAX2  
POC: Ben Major

- ( 147 ) Technical Systems Inc  
M11340, M11430  
PO Box 309  
Pryor, OK 74361  
918-825-0720  
Fax: 918-825-0723  
POC: Gary Brooks (Rep)  
Rep #1: Gary Brooks Co Bloomington, IL 309-452-2012
- ( 148 ) Tek Humitrol Inc  
M11330, M11370  
PO Box 19839  
Atlanta, GA 30325  
404-355-8563  
Fax: 404-452-0257  
POC: John Peery / Bob Doonan
- ( 149 ) The Applied Companies  
M11000, M11310, M11330, M11340, M11350, M11360, M11380, M11390,  
M11400, M11410, M11420, M11430, M11450, M11460, M11470  
13834 Del Sur St.  
San Fernando, CA 91340  
818-896-7443  
POC: Ron Winkler
- ( 150 ) Three M Co.(3M)/Sound Products  
E12700, E12710, E12720, E12730  
3M Center Building 551-1W-01  
St. Paul, MN 55144-1000  
612-733-9214  
Fax: 612-736-7614  
POC: Paul Nitschke
- ( 151 ) United Technologies Corp/Building Group/Carrier Corp/Carrier Air Conditioning  
M11310, M11340, M11390, M11400, M11420, M11430, M11440, M11450, M11460  
Carrier Pkwy  
PO Box 4808  
Syracuse, NY 13221  
315-432-6000  
POC: John Farrell
- ( 152 ) Valmont Electric Inc.  
E10410  
1430 East Fairchild Street  
Danville, IL 61832  
217-446-4600  
Fax: 217-431-5740  
POC: Knox Wilkie

- ( 153 ) Vilter Manufacturing Corp  
M11310, M11340, M11380, M11420  
2217 S 1st St  
Milwaukee, Wi 53207  
414-744-0111  
Fax: 414-744-3483  
POC: Gary Meszewski
- ( 154 ) W M Hobbs, LTD  
M10010, M10020  
3786 Norhteast Expressway  
Atlanta, GA 30340  
404-457-3000  
POC: Roger Graham
- ( 155 ) Weben-Jarco Inc  
M10100  
4007 Platinum Way  
PO Box 763460  
Dallas, TX 75376-3460  
214-637-0530 800-527-6449  
Fax: 214-330-6864  
POC: Doug Kinser  
Rep #1: (Wash., D.C.) Steck Sales 301-948-7502
- ( 156 ) Weil Pump Co  
M10600  
5921 W. Dickens Ave  
Chicago, Il 60639  
312-637-8844  
Fax: 312-637-5168  
POC: David Leidy (x263)
- ( 157 ) Wells Fargo Security Products  
E12420  
1010 North Glebe Road  
Arlington, VA 22201  
703-247-4250  
POC: Dallas Steele
- ( 158 ) Western Blower Corp  
M11100, M11110  
18625 Railroad Ave  
City of Industry, CA 91748  
818-964-6425  
POC: George Dunn



- ( 159 ) Westinghouse Electric Supply Co.  
E10460, E10470, E10480, E10600, E10610, E10620, E10900, E11000,  
E11100, E11200, E11210, E11220, E11230, E11300, E11310, E11320,  
E11400, E11500, E11510, E11520, E11530, E11540, E11840, E11900  
603 North Gilbert Street  
Danville, IL 61832  
217-442-1901  
Fax: 217-442-7317  
POC: Butch Feters
- ( 160 ) Whalen Co  
M11400  
PO Box 1390  
Easton, MD 21601  
301-822-9200  
Fax: 301-822-8926  
POC: Bruce Whalen
- ( 161 ) White Westinghouse International  
M10500  
10 Parkway Center Drive  
Pittsburgh, PA 15220  
412-928-8555  
Fax: 412-928-0922  
POC: Kurt Rogers
- ( 162 ) Wickes Mfg Co. Bohn Heat Transfer Div  
M11340  
1625 E Voorhees St  
Danville, IL 61832  
217-446-3710  
POC: Brian Zorns
- ( 163 ) Willow Manufacturing Inc/Lambert Industries Inc  
M11200  
County Road 109  
PO Box 17  
Parkville, MN 55773  
218-741-1510  
Fax: 218-741-1513  
POC: Steve Hinrichs
- ( 164 ) York International Corp  
M10400, M11310, M11340, M11350, M11390, M11400, M11420,  
M11430, M11460  
PO Box 1592  
York, PA 17405-1592  
717-771-7890  
POC: Paul Demeritte (Rep)  
Rep #1: (Washington, D.C.) 301-792-8181

- ( 165 ) Zero Corp/Mc Lean Midwest  
M10900, M11420  
4000 83rd Ave N  
Brooklyn Park, MN 55443-2594  
612-561-9400 800-284-2445  
Fax: 612-569-0533  
POC: Chip Lyon
- ( 166 ) Whirlpool Corporation Consumer Services  
M10500, M10510  
2303 Pipestone Road  
Benton Harbor, MI 49022  
800-253-1301  
Fax: 616-927-7829  
POC: Timothy Costello

## Appendix E: Equipment/Vendor Tables

This Appendix contains tables that graphically represent different types of equipment, their attributes, and the American vendors that supply the equipment. the following page gives a legend that explains how the data are represented in the tables.



## 50Hz Vendor Selection Tables

Class:	Rating:	100 /200V	110 /220V	120 /240V	127 /254V	220 /440V	230 /460V	240 /480V	277 /480V	# of Phases	50/60Hz Avail?	50Hz Sens?	50Hz Avail?	De- rated?	Derating Method:	% USA Made:	% USA Overhead?	UL Listed?	Vendors:	Comments:
E:10400 - Toggle Switches	1 - 60A 1.5, 5, 6, 10, 15, 20, 30A 20A to 600V, 30A to 250V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	1	Yes	No	Yes	No	N/A	100	100	Yes	#53 - Cooper Industries Inc./Arrow Hart #64 - Eagle Electric	
E:10410 - Dimmer Switches	600, 1000, 1500, 2000W 600, 1000, 1500, 2000W Incand.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 2	Yes	No	Yes	No	N/A	95	100	Yes	#143 - Square D Products #53 - Cooper Industries Inc./Arrow Hart #64 - Eagle Electric	
E:10420 - Explosion Proof Switches	600, 1000, 2000W Incand & Fluor 20 - 200A, 1-3 Pole, to 600V to 15A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	Yes	No	N/A	100	100	Yes	#152 - Valmont Electric #15 - Appleton Electric	Additional Vendors: #89
E:10430 - Disconnect Switches	10 - 200A, 3 Pole, to 600V up to 200A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	3	Yes	No	Yes	No	N/A	95	100	Yes	#104 - Micro Switch / Honeywell #143 - Square D Products	Additional Vendors: #24
E:10440 - Control Switches	10A, 600V Max 10A, 600V Max 10A, 600V Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	Yes	No	N/A	100	100	Yes	#15 - Appleton Electric #31 - Challenger Electrical Equipment #23 - Boltswitch	
E:10450 - Contactors	20A @ 250V, 30A @ 600V max Up to 200A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2 & 3	No	No	Yes	No	N/A	100	100	Yes	#15 - Appleton Electric #31 - Challenger Electrical Equipment #143 - Square D Products	Additional Vendors: #23, #64
E:10460 - Relays	Protective Relays 10 - 150A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	Yes	No	N/A	100	100	Yes	#19 - Beckwith Electric Co. #77 - HB Instrument Co.	
E:10470 - Safety Switches	2-12 Pole, to 600V AC coil, to 60A 30 - 600A, fused & unfused 600V max, 400, 600, 800, 1200A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	Yes	No	N/A	100	100	Yes	#161 - Westinghouse, Inc. #31 - Challenger Electrical Equipment #23 - Boltswitch	
E:10480 - Time Switches	600V max, 30-1200A, 2-4Wire 1-10A, Interval Timers Up to 600V, Up to 10A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	Yes	No	N/A	100	100	Yes	#161 - Westinghouse #18 - Automatic Timing & Control #143 - Square D Products	Additional Vendors: #23
E:10600 - Motor Starters (Unfused)	40A, 24hr, 7 day, or astro. dial Up to 600V, Up to 10A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	Yes	No	N/A	100	100	Yes	#15 - Appleton Electric #31 - Challenger Electrical Equipment #54 - Cooper Industries / Crouse-Hinds	Additional Vendors: #161
E:10610 - Motor Starters (Fused)	5 - 200HP @ 600V (Nema 0-5) Up to 100HP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	No	Yes	Yes	No	N/A	100	100	Yes	#15 - Appleton Electric #31 - Challenger Electrical Equipment #54 - Cooper Industries / Crouse-Hinds	Additional Vendors: #161
E:10620 - Motor Starters (W/Ckt Brkr)	5 - 200HP @ 600V (Nema 0-5) Up to 100HP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	(1)	Yes	Yes	No	N/A	100	100	Yes	#15 - Appleton Electric #31 - Challenger Electrical Equipment #54 - Cooper Industries / Crouse-Hinds	Additional Vendors: #161
E:10700 - Fuses	1-200A Class H.K.R.R.K 1-600A 1-600A, Up to 600V Max, D41	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	Yes	Yes	Yes	No	N/A	100	100	Yes	#55 - Cooper / McGraw-Edison #134 - S & C Electric #64 - Eagle Electric	Additional Vendors: #134
E:10710 - Fuse Cabinets	To 600V, 200A max. To 600V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	3 & 4W	Yes	Yes	Yes	No	N/A	100	100	Yes	#55 - Cooper / McGraw-Edison #143 - Square D Products	Additional Vendors: #134

On This Page:

Switches, Motor Starters, Fuses, &amp; Fuse Cabinets

(1) Depends on Type of Equipment

(2) Performance Derating

(3) ETL &amp; UL Listed

(4) Components Are Listed

(5) UL &amp; AGA Listed

(6) Only Explosion-Proof

(7) ASME Section 4

(8) 60Hz Only

(9) AGA Approved

(10) Different Components Used

(11) Slower Feed Speed

(12) By Request

50Hz Vendor Selection Tables

Class:	Rating:	100	110	120	120	127	220	240	277	# of Phases	50/60Hz Avail?	50Hz Spec'd Avail?	De- rated?	Derating Method:	% USA Made:	% USA Owned:	UL Listed?	Vendors:	Comments:
E10900 - Meter Centers & Sockets	Single & Multiple, to 600V Up to 600V AC Up to 600V AC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #62
E11000 - Panelboards	60 - 1200A, to 600V, fuse, Ckt Brkr Up to 600V AC, 30-1200A 100A-1200A, 600V Max.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #15, 44, 143
E11100 - Circuit Breakers	15 - 3000A, to 600V 15-3000A, 600V Max. 10-4000A, 4160V Max.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	(1)	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #3, 44, 143
E11200 - Switchboards No Main Disconnect	Up to 5000A, to 600V Up to 3000A, 600V Max. 10-4000A, 600V Max.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #143
E11210 - Switchboards W/Fused switch & CT	Up to 5000A, to 600V Up to 3000A, 600V Max. 10-4000A, 600V Max.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #143
E11220 - Switchboards W/Pressure switch+CT	Up to 5000A, to 600V Up to 3000A, 600V Max. 10-4000A, 600V Max.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #143
E11230 - Switchboards W/Ckt Brkr & CT	Up to 5000A, to 600A Up to 3000A, 600V Max. 10-4000A, 600V Max.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #62, 143
E11300 - Ammeter AC indicating, switch	5-5000A 0-3000A, 0-15KV 100A - 5000A, 600V-14.4KV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	No	N/A	100	100	Yes	#143 - Square D Products #73 - General Electric Co. #161 - Westinghouse, Inc.	
E11310 - Voltmeter AC indicating, switch	0-38KV, 5Amp and Up 0-3000A, 0-15KV 100A - 5000A, 600V-14.4KV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	No	N/A	100	100	Yes	#143 - Square D Products #73 - General Electric Co. #161 - Westinghouse, Inc.	
E11320 - Wattmeter	0-999,999KVA 0-3000A, 0-15KV 100A - 5000A, 600V-14.4KV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	No	N/A	100	100	Yes	#143 - Square D Products #73 - General Electric Co. #161 - Westinghouse, Inc.	
E11400 - Motors	115V AC-460V AC, 16-6000HP 110-14000V AC, 1/8-5000HP 5-2500HP	No	No	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	No	N/A	90	100	Yes	#99 - Marathon Electric #130 - Reliance Electric #161 - Westinghouse, Inc.	
E11500 - Transformers Buck-Boost Type	600V, 25KVA - 5KVA 55KVA - 160KVA 25KVA - 1500KVA, 4160V Max.	No	No	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	No	Yes	Yes	spc. ord.	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #5, 143
E11510 - Transformers Dry Type	600V, 9KVA - 500KVA 25KVA - 500KVA 25KVA - 1500KVA, 4160V Max.	No	No	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	No	Yes	Yes	spc. ord.	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #5, 143
E11520 - Transformers Isolating	600V, 7.5KVA - 550KVA 5KVA - 500KVA 25KVA - 1500KVA, 4160V Max.	No	No	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	No	Yes	Yes	spc. ord.	100	100	Yes	#31 - Challenger Electrical Equipment #73 - General Electric Co. #161 - Westinghouse, Inc.	Additional Vendors: #5

(9) AGA Approved  
(10) Different Components Used  
(11) Slower Feed Speed  
(12) By Request

(5) UL & AGA Listed  
(6) Only Explosion-Proof  
(7) ASME Section 4  
(8) 60Hz Only

(1) Depends on Type of Equipment  
(2) Compliance Derating  
(3) ETL & UL Listed  
(4) Components Are Listed

On This Page:  
Meter Centers & Sockets, Panelboards, Circuit Breakers, Switchboards,  
Motors, Motors, & Transformers

50Hz Vendor Selection Tables

Class:	Rating:	100 /200V	110 /220V	120 /240V	127 /220V	220 /380V	230 /400V	240 /415V	277 /480V	# of Phases	50/60Hz Avail?	50Hz Avail?	De- rated?	De- rating Method	% USA Made	% USA Owned	UL Listed?	Vendors:	Comments:
E:11530 - Transformers Oil Filled	112.5 - 1000KVA To 69KV 333-1500KVA To 69KV 50VA - 1500KVA To 4160V	No Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	No Yes Yes	No Yes Yes	No Yes Yes	No Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes No	Yes Yes Yes	No No Yes	N/A N/A KVA	100 100 100	100 100 100	Yes Yes Yes	#2 - A.B.B. Power #109 - Niagra Transformer Corp. #161 - Westinghouse	
E:11540 - Transformers Silicon Filled	112.5 - 1000KVA To 34.5KV 333-1500KVA To 69KV 50VA - 1500KVA To 4160V	No Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	No Yes Yes	No Yes Yes	No Yes Yes	No Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes No	Yes Yes Yes	No No Yes	N/A N/A KVA	100 100 100	100 100 100	Yes Yes Yes	#2 - A.B.B. Power #109 - Niagra Transformer Corp. #161 - Westinghouse Electric Supply Co.	
E:11700 - Computer Power Supplies - Automatic Voltage Regulators	10A - 120A 800VA - 25KVA 25A - 40,000A	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#39 - Computer Power Inc. #75 - General Signal Corp / Sola Division #122 - Bellanca Electric Co/Kato Engineering	
E:11710 - Computer Power Supplies - Computer Grade Isolation Transformers	10A - 120A 800VA - 25KVA 25A - 40,000A	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#39 - Computer Power Inc. #41 - Controlled Power Co. #124 - Rapid Power Technologies	
E:11720 - Computer Power Supplies - Transient Voltage Suppressors	10A - 120A 800VA - 25KVA 25A - 40,000A	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#39 - Computer Power Inc. #41 - Controlled Power Co. #124 - Rapid Power Technologies	
E:11730 - Computer Power Supplies - Regulator Transformers	10A - 120A 800VA - 25KVA 25A - 40,000A	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#39 - Computer Power Inc. #41 - Controlled Power Co. #124 - Rapid Power Technologies	
E:11740 - Computer Power Supplies - Power Conditioners	10A - 120A 800VA - 25KVA 25A - 40,000A	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#39 - Computer Power Inc. #41 - Controlled Power Co. #124 - Rapid Power Technologies	
E:11800 - Power Systems - Automatic Transfer Switches	30A - 4000A, 600V max 100A - 2600A, 600V max 10 - 3000KVA, 600V max	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#17 - Asco Controls/Automatic Switch Co. #29 - Chertpillar Inc. #54 - Cyberex Inc.	
E:11810 - Power Systems - Non-automatic Transfer Switches	30A - 4000A, 600V max 100A - 2600A, 600V max 10 - 3000KVA, 600V max	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#17 - Asco Controls/Automatic Switch Co. #29 - Chertpillar Inc. #54 - Cyberex Inc.	
E:11820 - Power Systems - Generator Set	500KW - 3000KW 100KW - 4500KW 1500-10000KW / 2300-13800V	Yes Yes N/A	Yes Yes N/A	Yes Yes N/A	Yes Yes N/A	Yes Yes N/A	Yes Yes N/A	Yes Yes N/A	Yes Yes N/A	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	Yes No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#22 - Bogue Electric Manufacturing Co. #29 - Chertpillar Inc. #58 - Dresser Rand Co.	Additional Vendors: #51
E:11830 - Power Systems - Line Poles, Towers, & Overhead Conductors	69-765KV 600A, 7.5KV - 200KV 15KV-765KV	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	1 & 3 1 & 3 1 & 3	Yes Yes Yes	No No No	No No No	N/A N/A N/A	90 100 100	100 100 100	Yes Yes Yes	#1 - A.B. Chance Co. #25 - Bridges Electric Inc. #94 - Lindsey Manufacturing Co.	Additional Vendors: #91
E:11840 - Power Systems - Substation Equipment	600A 600A/480V - 34.5KV 75-4000KVA / 480V - 15KV 600A 600A/480V-34.5KV	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 70 100	100 100 100	Yes Yes Yes	#31 - Challenger Electrical Equipment #72 - General Electric/Industry Sales & Service #161 - Westinghouse	Additional Vendors: #144
E:11900 - Capacitors	2.4 - 34.5KV / 50-500KV AR 200V-27.5KV/2-10000KV AR	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	1 & 3 1 & 3	Yes Yes	Yes Yes	No No	N/A N/A	100 70	100 100	Yes Yes	#45 - Cooper Industries/McGraw Edison #72 - General Electric/Industry Sales & Service #161 - Westinghouse Electric Supply Co.	
E:12000 - Exit & Emergency Lighting - Exit Light	50-500KV AR, 600V up to 35KV 50Hz available at 220V +/- 10% 50Hz available at 220V +/- 10% 50Hz available at 220V +/- 10%	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 1 1	No Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 95 100	100 100 100	Yes Yes Yes	#32 - Chloride Systems/Lighting Alliance #48 - Conestoga Electric/Ready Made Sign #59 - Dual-Lite Inc.	

(9) AGA Approved  
(10) Different Components Used  
(11) Slower Feed Speed  
(12) By Request

(5) UL & AGA Listed  
(6) Only Explosion-Proof  
(7) ASME Section 4  
(8) 60Hz Only

(1) Depends on Type of Equipment  
(2) Performance Derating  
(3) ETL & UL Listed  
(4) Components Are Listed

On This Page:  
Transformers, Computer Power Supplies, Power System Equipment,  
Capacitors, Exit Lighting

## 50117. Vendor Selection Tables

Class:	Rating:	100 1200V	110 1220V	120 1208V	127 1380V	220 1400V	240 1415V	277 480V	# of Phases	50/60Hz Avail?	50Hz Sense?	50Hz rate?	De- rating Method:	% USA Made:	%USA Owned/Used?	UL	Vendors:	Comments:
E:12010 - Exit & Emergency Lighting - Exit Light Single Face Fluorescent	50Hz available at 220V +/- 10%	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	No	N/A	100	100	Yes	#32 - Chloride Systems/Lighting Alliance	
	50Hz available at 220V +/- 10%	No	Yes	Yes	No	No	No	Yes	1	No	Yes	No	N/A	95	100	Yes	#48 - Conestoga Direct/Ready Made Sign	
	50Hz available at 220V +/- 10%	Yes	Yes	Yes	No	No	No	Yes	1	No	Yes	No	N/A	100	100	Yes	#59 - Dual-Lite Inc.	
	50Hz available at 220V +/- 10%	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	No	N/A	100	100	Yes	#32 - Chloride Systems/Lighting Alliance	
	50Hz available at 220V +/- 10%	No	Yes	Yes	No	No	No	Yes	1	Yes	Yes	No	N/A	95	100	Yes	#48 - Conestoga Direct/Ready Made Sign	
E:12020 - Exit & Emergency Lighting - Exit Light Double Face Incandescent	50Hz available at 220V +/- 10%	Yes	Yes	Yes	No	No	No	Yes	1	Yes	Yes	No	N/A	100	100	Yes	#59 - Dual-Lite Inc.	
	50Hz available at 220V +/- 10%	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	No	N/A	100	100	Yes	#32 - Chloride Systems/Lighting Alliance	
	50Hz available at 220V +/- 10%	No	Yes	Yes	No	No	No	Yes	1	No	Yes	No	N/A	95	100	Yes	#48 - Conestoga Direct/Ready Made Sign	
	50Hz available at 220V +/- 10%	Yes	Yes	Yes	No	No	No	Yes	1	No	Yes	No	N/A	100	100	Yes	#59 - Dual-Lite Inc.	
	50Hz available at 220V +/- 10%	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	No	N/A	100	100	Yes	#32 - Chloride Systems/Lighting Alliance	
E:12040 - Exit & Emergency Lighting - Emergency Light Units - Battery Operated	6.12-32 VDC Operation	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	No	N/A	100	100	Yes	#48 - Conestoga Direct/Ready Made Sign	
	6VDC Battery	No	No	Yes	No	No	No	No	1	No	Yes	No	N/A	100	100	Yes	#59 - Dual-Lite Inc.	
	4, 6, and 12VDC units	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	95	100	Yes	#15 - Appleton Electric	Additional Vendors: #47
	60 - 300W	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#44 - Cooper Industries/Crouse-Hinds	
	100 - 500W	No	No	Yes	No	No	No	No	Yes	1 & 3	Yes	No	N/A	100	100	Yes	#122 - Prescolite/U.S.I. Lighting	Additional Vendors: #97
E:12100 - Light Fixtures External Incandescent	60W - 150W	No	No	Yes	Yes	Yes	No	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#15 - Appleton Electric	
	35-1000W 1P1L 100-1000W 3P1P	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	Yes	(10)	100	100	Yes	#44 - Cooper Industries/Crouse-Hinds	Additional Vendors: #97
	50 - 400W	No	Yes	Yes	Yes	Yes	No	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#122 - Prescolite/U.S.I. Lighting	
	35W - 150W/50W - 175W	No	Yes	Yes	Yes	Yes	No	Yes	1 & 3	Yes	Yes	Yes	(10)	100	100	Yes	#15 - Appleton Electric	Additional Vendors: #47
	60 - 300W	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#44 - Cooper Industries/Crouse-Hinds	Additional Vendors: #97
E:12120 - Light Fixtures Internal Incandescent	100 - 500W	No	No	Yes	No	No	No	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#122 - Prescolite/U.S.I. Lighting	
	30W-300W	No	No	Yes	No	No	No	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#15 - Appleton Electric	Additional Vendors: #97
	40 - 1500W	No	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	Yes	(10)	100	100	Yes	#44 - Cooper Industries/Crouse-Hinds	
	40 - 400W	No	No	Yes	No	No	No	Yes	1 & 3	Yes	No	No	N/A	100	100	Yes	#122 - Prescolite/U.S.I. Lighting	
	30W - 175W	No	No	Yes	No	No	No	Yes	1 & 3	Yes	Yes	Yes	(10)	100	100	Yes	#15 - Appleton Electric	Additional Vendors: #97
E:12130 - Light Fixtures Internal Fluorescent, Metal Halide, & Sodium	50m - 2A	No	No	Yes	Yes	Yes	No	Yes	1 & 3	Yes	Yes	Yes	(10)	100	100	Yes	#137 - Simplex	
	6W	No	Yes	Yes	Yes	Yes	No	Yes	1 & 3	No	Yes	Yes	(10)	100	100	Yes	#62 - Electric Time Co.	
	10A - 15A	No	Yes	Yes	Yes	Yes	No	Yes	1 & 3	No	Yes	Yes	(10)	50	100	Yes	#111 - Nu Tone Inc.	
	500ma - 1.5A	No	Yes	Yes	Yes	Yes	No	No	1	Yes	Yes	No	N/A	100	100	Yes	#56 - Detection Systems Inc.	Additional Vendors: #26, 106
	2-3A	Yes	Yes	Yes	Yes	Yes	Yes	No	1	No	Yes	Yes	(10)	90	100	Yes	#118 - Pitway Corporation/Ademco	
E:12400 - Burglar Alarms	40ma - 200ma	No	No	Yes	Yes	Yes	Yes	Yes	1	Yes	Yes	Yes	(10)	100	100	Yes	#123 - Ricon Incorporated	
	2A, 108-132V, 220V	No	Yes	Yes	Yes	Yes	Yes	Yes	1	Yes	Yes	No	N/A	100	100	Yes	#106 - Monaco	
	10 - 15A	No	Yes	Yes	Yes	Yes	No	Yes	1 & 3	No	Yes	Yes	(10)	50	100	Yes	#111 - Nu Tone Inc.	
	2-3A	No	Yes	Yes	Yes	Yes	Yes	No	1	No	Yes	No	N/A	90	100	Yes	#118 - Pitway Corporation/Ademco	
	10 - 15A	No	Yes	Yes	Yes	Yes	No	Yes	1	Yes	Yes	Yes	(10)	100	100	Yes	#26 - Burle Industries Inc/Security Products	
E:12420 - Surveillance	10 - 15A	No	Yes	Yes	Yes	Yes	Yes	Yes	No	1	Yes	Yes	(10)	100	100	Yes	#111 - Nu Tone Inc.	
	10 - 15A	No	Yes	Yes	Yes	Yes	No	Yes	1 & 3	No	Yes	Yes	(10)	50	100	Yes	#157 - Wells Fargo Security Products	
	10 - 15A	No	Yes	Yes	Yes	Yes	Yes	Yes	1	Yes	Yes	No	N/A	95	100	Yes	#115 - Pasco Sound Products Inc.	
	10W - 500W	No	Yes	Yes	Yes	Yes	No	No	1 & 3	No	No	Yes	N/A	10	100	Yes	#125 - Rauland-Borg Corp	
	10W - 500W	No	Yes	Yes	Yes	Yes	Yes	Yes	No	1	Yes	No	N/A	100	100	Yes	#150 - 3M Sound Products	
E:12700 - Public Address Systems	3W - 120W	No	Yes	Yes	Yes	Yes	Yes	Yes	No	1	Yes	No	N/A	100	100	Yes	#115 - Pasco Sound Products Inc.	Additional Vendors: #112
	100ma - 5A	No	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	No	Yes	Yes	(10)	100	100	Yes	#125 - Rauland-Borg Corp	
	1/2 Watt Input	No	Yes	Yes	Yes	Yes	Yes	Yes	1	Yes	Yes	No	N/A	100	100	Yes	#150 - 3M Sound Products	
	1/2 Watt Input	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	Yes	(10)	100	100	Yes	#150 - 3M Sound Products	
	1/2 Watt Input	No	Yes	Yes	Yes	Yes	Yes	Yes	1	No	Yes	Yes	(10)	100	100	Yes	#150 - 3M Sound Products	

**On This Page:**

**On This Page:**  
**Exit & Emergency Lighting. Light Fixtures.**

... Components: Detection Systems and P.A. & Sound Systems



### 50Hz Vendor Selection Tables

[illegible]

(\*) Uses DC voltage provided by Fire Alarm Equipment

**On This Page:**  
**Sound System Components, House Telephone Systems,  
 Fire Alarm Systems, Fire Detection Equipment, & Receipts**

- (1) Depends on Type of Equipment
- (2) Performance Degrading
- (3) ETL & UL Listed
- (4) Components Are Listed

- (5) UL & AGA Listed
- (6) Only Explosion-Proof
- (7) ASME Section 4
- (8) 60Hz Only

( 9 ) AGA Approved  
( 10 ) Different Components Used  
( 11 ) Slower Feed Speed  
( 12 ) By Request

## 50Hz Vendor Selection Tables

Class:	Rating:	100 /200V /220V	110 /208V	120 /240V	127 /220V	220 /380V	230 /400V	240 /415V	277 /480V	# of Phases	50/60Hz Avail?	50Hz Sens?	50Hz Avail?	De- rated?	Derating Method:	% USA Made:	% USA Owned:	UL Listed?	Vendors:	Comments:
M10000 - Swimming Pool Heaters	150MBH - 5000MBH 12Kw-57Kw 9.1MBH - 295.9MBH	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	3 1 & 3 3	Yes Yes No	Yes Yes No	Yes Yes No	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes No	#25 - Bryan Steam Corporation #35 - Cowles Heater Company #60 - Dumont Industries	Additional Vendors: #65, 95, 96, 139
M10010 - Swimming Pool Underwater Lights	Swimming Pool Grade 100, 300, 500W 250W, 500W	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 1 1	Yes Yes Yes	No Yes Yes	No Yes Yes	No Yes Yes	N/A (*) N/A	100 100 100	100 100 100	Yes Yes Yes	#76 - Genlyne Group, Inc. #112 - Padlock Pool Equipment #154 - W.M. Hobbs, Ltd.	
M10020 - Swimming Pool Fillers	1/4 - 3/4 Custom CFM 75, 100CFM	No Yes spl	Yes Yes spl	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes No No	CFM N/A N/A	100 100 100	100 100 100	(8) Yes Yes	#63 - ESSSEI Industries, Inc. #112 - Padlock Pool Equipment #154 - W.M. Hobbs, Ltd.	
M10100 - Water Heaters Gas Fired	120MBH - 1750MBH 90MBH - 3000MBH 30MBH - 500MBH	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	(1) No Yes	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#9 - Aldrich Company #96 - Lochmar Corporation #107 - Mor-Plo Industries #132 - Rheem/Ruud Company	Additional Vendors: #132, 139, 146, 155
M10110 - Water Heaters Electric	90MBH - 3000MBH 30MBH - 500MBH 2 - 6KW IPL 6 - 54KW 3PH	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 70	100 100 100	Yes Yes Yes	#96 - Lochmar Corporation #107 - Mor-Plo Industries #132 - Rheem/Ruud Company	Additional Vendors: #139, 146
M10120 - Water Heaters Oil Fired	150MBH - 1750MBH 90MBH - 3000MBH 199MBH - 2500MBH	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	(1) No Yes	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#9 - Aldrich Company #96 - Lochmar Corporation #139 - Smith Corporation	
M10200 - Boilers Electric	49 MBH - 98.2MBH 90 MBH - 3000MBH 51 MBH - 436 MBH	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#25 - Bryan Steam Corporation #96 - Lochmar Corporation #100 - Madley Corp / Well-McLain	Additional Vendors: #121
M10210 - Boilers Solid Fuel	2600MBH - 22300MBH 170MBH - 3400MBH 3000MBH - 4000MBH	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	Yes No Yes	(11) N/A (11)	100 100 100	100 100 100	Yes Yes Yes	#46 - Cappa Engineering Corp. #51 - Greewood Industrial Furnaces #86 - Industrial Boiler Company	
M10220 - Boilers Oil Fired	100MBH - 15000MBH 150MBH - 1750MBH 190MBH - 2520MBH	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#8 - Ajax Boiler Company #9 - Aldrich Company #36 - Columbia Boiler Co. of Pottstown	Additional Vendors: #46, 52, 57, 61, 85, 100
M10230 - Boilers Gas Fired	100MBH - 15000MBH 120MBH - 1750MBH 150-15000MBH, 15-350PSI	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#8 - Ajax Boiler Company #9 - Aldrich Company #25 - Bryan Steam Corporation	Additional Vendors: #36, 46, 52, 57, 61, 85, 96, 100, 114, 121
M10300 - Duct Heaters	40MBH - 550MBH 37.5 - 608MBH 100 - 400MBH	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	Yes Yes No	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	(1) (10) N/A	100 100 100	100 100 100	Yes Yes Yes	#68 - Emerson Electric Co. / Wiegand #80 - Hastings Industries, Inc. #129 - Reed National / Sterling Radiator	Additional Vendors: #145
M10400 - Furnaces Hot Air Heating	31.7MBH - 110.7MBH 150MBH - 3000MBH 50MBH - 300MBH	No Yes No	Yes Yes Yes	Yes Yes Yes	No No No	No No No	No No No	No No No	No No No	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	No Yes No	N/A (1) N/A	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #57 - Duxie Technologies / York Shipley #92 - Lennox Industries, Inc.	Additional Vendors: #127, 129, 136, 164
M10410 - Furnaces Heating/Cooling	24MBH - 60MBH 20 MBH - 75MBH 50MBH - 300MBH	No Yes No	Yes Yes Yes	Yes Yes Yes	No No No	No No No	No No No	No No No	No No No	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	No Yes No	N/A (1) (1)	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #38 - Command-Aire Corporation #92 - Lennox Industries	Additional Vendors: #80, 82, 127

(\*) Special Transformer Used

(1) Depends on Type of Equipment

(5) UL &amp; AGA Listed

(9) AGA Approved

(2) Performance Derating

(6) Only Explosion-Proof

(10) Different Components Used

(3) ETL &amp; UL Listed

(7) ASME Section 4

(11) Slower Feed Speed

(4) Components Are Listed

(12) By Request

On This Page:  
Swimming Pool Equipment, Water Heaters, Boilers,  
Duct Heaters, & Furnaces

## 5011z Vendor Selection Tables

Class:	Rating:	100 /200V	110 /208V	120 /240V	127 /208V	220 /380V	240 /400V	277 /480V	# of Phases	50/60Hz Avail?	5011z Sens?	5011z Avail?	De- rated?	Derating Method	% USA Made	% USA Owned	UL Listed?	Vendors:	Comments:
M110510 - Appliances (Kitchen)	1.5 & 30A Equipment 1.5A through 60A Equipment Major Appliances Only	Yes No (*)	Yes Yes (*)	Yes Yes No	Yes Yes No	Yes Yes Yes	No No Yes	No No Yes	1 & 3 1 & 3 1	Yes No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	(2) (2) (2)	100 100 95	100 100 100	Yes Yes Yes	#103 - Maytag Corporation #166 - Whirlpool Corporation #161 - White Westinghouse	
M110510 - Appliances (Laundry)	1.5A & 30A Equipment 1.5 through 60A Equipment	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	No Yes Yes	No Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes No Yes	(2) N/A (2)	100 90 100	100 100 100	Yes Yes Yes	#103 - Maytag Corporation #142 - Speed Queen Corporation #166 - Whirlpool Corporation	
M110520 - Appliances (Central Vacuum Cleaning)	80-280CFM, 85-150 inches H2O 5-1000HP, 100-25,000 CFM	Yes No Yes	Yes No Yes	Yes No Yes	Yes No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes No Yes	(2) N/A (2)	100 100 100	100 100 100	Yes Yes Yes	#30 - Central Vac International #34 - Clarkson Industries / Hoffman Div. #135 - Sequeda Vacuum Systems, Inc.	
M110600 - Pumps	135 CFM, 11.5 & 130 in. H2O 3-11000CFM, 1-550A 21-85CFM, 1A-15A	No No Yes	Yes Yes Yes	Yes Yes Yes	No No Yes	Yes Yes Yes	Yes No Yes	No No Yes	1 & 3 1 & 3 1 & 3	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes No Yes	GPM N/A GPM	100 100 100	100 100 100	(1) Yes (6)	#74 - General Signal Corp / Aurora Pump #101 - Marley Pump Co. / Red Jacket Pumps #156 - Well Pump Company	Additional Vendors: #4, 117
M110900 - Heat Exchangers	1/4HP - 35HP Water to Water, 50-2000CFM Water to Water, very wide range	N/A N/A Yes	N/A N/A Yes	N/A N/A Yes	N/A N/A Yes	N/A N/A Yes	N/A N/A Yes	N/A N/A Yes	N/A N/A 1	Yes Yes Yes	No No Yes	Yes Yes Yes	Yes No Yes	CFM N/A (2)	80 100 100	100 100 100	(4) Yes (4)	#14 - Amsted Inc / Baltimore Allicol #61 - Dunham-Bush #165 - Zero Corp / Mid-Can Midwest	
M110910 - Heat Recovery Packages	Custom 2000 - 18000CFM 2600CFM - 38500CFM	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 3	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes No	(1) (1) N/A	100 100 100	100 100 100	Yes Yes Yes	#57 - Donlue Technologies / York Shipley #80 - Hastings Industries Inc. #133 - Rupp Industries Inc.	
M111000 - Humidifiers	5-200 Lb/Day 1500 & 2000W, 13 & 20 Gal/Day 50 - 3000 lb/day	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 3	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes No	(1) (1) N/A	100 100 100	100 100 100	No Yes Yes	#28 - Curnes Company Inc. #138 - Skuttle Manufacturing #149 - The Applied Companies	
M111100 - Fans (Exhaust)	200 - 25000 CFM Up to 1.5 in. of static pressure 50 - 700,000 CFM	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 3 1 & 3	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes No Yes	N/A N/A (2)	100 100 100	100 100 100	Yes Yes Yes	#11 - American Fan Co. #12 - American Standard / Trane Co. #13 - Ampco-Pittsburgh Co / Buffalo Forge	Additional Vendors: #6, 10, 42 90, 138
M111110 - Fans (Centrifugal)	Up to 20,000CFM, 150HP Max. 50 - 700,000 CFM	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes No	N/A (2) N/A	100 100 100	100 100 100	Yes Yes No	#12 - American Standard / Trane Co. #13 - Ampco-Pittsburgh Co / Buffalo Forge #158 - Western Blower	Additional Vendors: #28, 42
M111200 - Fans (Other)	1/6HP - 100HP Q-Fan: 1800-600,000CFM Propeller: 1000 - 50000 CFM Pressure Fans: 50-4000 CFM	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	1 & 3 1 & 3 1 & 3 1 & 3	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes No Yes Yes	N/A N/A (2) N/A	100 100 100 100	100 100 100 100	Yes Yes Yes Yes	#12 - American Standard / Trane Co. #11 - American Fan Co. #33 - Chidnaust Pan Co.	
M112000 - Infra-Red Heating Units	60 MBH - 1000MBH 26MBH - 175MBH 1MBH - 120MBH	No No No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	No No Yes	No Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	(5) (5) (5)	#50 - Cox Manufacturing Co., Inc. #80 - Gas Fired Products, Inc. #163 - Willow Manufacturing / Lambert	Additional Vendors: #7, 87
M112100 - Make-up Air Units	2000 - 110,000CFM 2000-150,000CFM 1000 - 150,000 CFM	No Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	Yes Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes No	(1) (1) N/A	100 100 100	100 100 100	Yes Yes No	#57 - Donlue Technologies / York Shipley #80 - Hastings Industries Inc. #128 - Reed National / Sterling Alton	Additional Vendors: #27, 90, 129, 145
M112200 - Space Heaters	400MBH - 2500MBH 150 MBH - 3000MBH 8.9 MBH - 153.6 MBH	No No No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	(1) (1) (1)	100 100 100	100 100 100	Yes Yes Yes	#57 - Donlue Technologies / York Shipley #68 - Emerson Electric/Wlegand Division	
M113100 - Compressors	1 Ton To 1000Ton 1/2 Ton - 30 Ton 5-25HP And 50-100Ton	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 3	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes No Yes	N/A (2) (2)	100 50 100	100 100 100	Yes No Yes	#12 - American Standard Inc / Trane Co. #151 - United Technologies / Carrier A/C #164 - York International	Additional Vendors: #67, 149, 153

On This Page:

Appliances, Pumps, Heat Exchangers, Heat Recovery Packages,  
Humidifiers, Fans, Heating Units, & Compressors

(1) Depends on Type of Equipment

(2) Performance Derating

(3) ETL &amp; UL Listed

(4) Components Are Listed

(5) UL &amp; AGA Listed

(6) Only Explosion-Proof

(7) ASME Section 4

(8) 60Hz Only

(9) AGA Approved

(10) Different Components Used

(11) Slower Feed Speed

(12) By Request

501hz Vendor Selection Tables

Class	Rating	100 200V	110 220V	170 208V	120 240V	127 220V	220 380V	240 400V	277 480V	# of Phases	50/60Hz Avail?	50/60Hz Sens?	50/60Hz Avail?	De- rated?	Detailing Method	% USA Made	% USA Owned	UL Listed?	Vendor	Comments
M11330 - Computer Room Air Conditioning	3 Ton - 20 Ton 1 Ton - 100 Ton	Yes No	Yes Yes	Yes Yes	Yes Yes	Yes Yes	No Yes	Yes Yes	Yes Yes	3 1 & 3	Yes Yes	Yes Yes	Yes Yes	No No	N/A N/A	100 100	100 100	(3) (4)	#40 - Contempo Engineering #148 - Tek Humint Inc.	Additional Vendors: #55, 81
M11340 - Condensers	18 MBH - 6000 MBH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1 & 3	Yes	Yes	Yes	Yes	(1)	100	100	Yes	#149 - The Applied Companies	Additional Vendors: #12 - American Standard / Trane Co. #151 - United Technologies / Carrier A/C
M11350 - Air Conditioning Controls	1 Ton - 1000 Ton 1.5 Ton - 100 Ton 10 Ton - 600 Ton	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #85 - Hydronorm Inc. #164 - York International	Additional Vendors: #14, 16, 61, 67, 82, 85, 92, 147, 149, 153
M11360 - Air Conditioning Cooling Towers	Full Range Full Range Full Range	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#14 - Amsted Industries/Baltimore Alrcoll #69 - Evapco Inc. #149 - The Applied Companies	Additional Vendors: #150
M11370 - Air Conditioning Dehumidifiers	5 Ton To 10,000 Ton 40 Ton - 300 Ton 10 Ton - 500 Ton	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes No Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 3 1 & 3	No Yes Yes	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	No No No	#60 - Dumont Industries #98 - MRI Company #148 - Tek Humint Inc.	Additional Vendors: #92, 94, 129, 149, 153
M11380 - Air Conditioning Evaporators	1.75 Ton - 70 Ton 30 CFM - 50,000 CFM 1 - 20 Ton - 30 MBH 12 MBH - 6000 MBH 12 MBH - 30 MBH 12 MBH - Custom MBH	No No Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	1 & 3 1 & 3 1 & 3 1 & 3 1 & 3 1 & 3	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	No No No No No No	N/A N/A N/A N/A N/A N/A	100 100 100 100 100 100	100 100 100 100 100 100	Yes Yes Yes Yes Yes Yes	#69 - Evapco #127 - Reed Natl/Sterling Alton Applied Air #140 - Snyder General Corp #12 - American Standard / Trane Co. #92 - Lennox Industries #164 - York International	Additional Vendors: #13, 18, 62, 111, 149, 151
M11390 - Air Conditioning Fan Coil Air Conditioning	200 CFM - 4000 CFM 800 CFM - 2000 CFM 100 CFM - 4000 CFM	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #92 - Lennox Industries #164 - York International	Additional Vendors: #19, 38, 78, 81, 82, 85, 110, 149, 151
M11400 - Air Conditioning Heat Pumps	1 Ton - 25 Ton 800 CFM - 2000 CFM	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	1 & 3 1 & 3	No No	Yes Yes	Yes Yes	No No	N/A N/A	100 100	100 100	Yes Yes	#12 - American Standard / Trane Co. #92 - Lennox Industries	Additional Vendors: #110, 149
M11410 - Air Conditioning Roof-Top Units	1 Ton - 110 Ton 2 Ton - 20 Ton 10 Ton - 150 Ton	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #92 - Lennox Industries #127 - Reed Natl/Sterling Alton Applied Air	Additional Vendors: #16, 18, 21, 61, 81, 82, 94, 110, 149, 151
M11420 - Self-Contained Single Package Air Conditioning	1 Ton - 80 Ton 2 Ton - 20 Ton 1 Ton - 100 Ton	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1 & 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #92 - Lennox Industries #164 - York International	Additional Vendors: #16, 18, 21, 61, 81, 82, 94, 110, 149, 151
M11430 - Air Conditioning Water Chillers	130 - 1500 Ton 15 Ton - 5000 Ton 5 Ton - 8000 Ton	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	3 3 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	100 100 100	100 100 100	Yes Yes Yes	#12 - American Standard / Trane Co. #151 - United Technologies / Carrier A/C #164 - York International	Additional Vendors: #40, 55, 61, 81, 120, 147, 149, 151
M11440 - Air Conditioning Window Units	5600 BTU - 33,500 BTU 5400 BTU - 24000 BTU 5000 To 30000 BTU	No No Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 & 3 1 & 3 1	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	No No No	(2) N/A (2)	100 100 50	100 100 100	No Yes No	#54 - Custom Controls Co. #126 - Raytheon Co / Amara Refrigeration #151 - United Technologies / Carrier A/C	Additional Vendors: #18, 94, 105
M11450 - Air Conditioning Air Cleaners	300 CFM - 1400 CFM 20 - 10,000 SCFM 450 CFM To 4000 CFM	No Yes No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	1 1 & 3 1	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A (1)	100 100 100	100 100 100	No No No	#111 - North American Carrier Co. #150 - The Applied Companies #145 - Slamm Int / Powmatic	Additional Vendors: #18, 94, 105
M11460 - Air Conditioning Air Handling Units	0 To 50000 CFM 0 To 30000 CFM 1000 To 70000 CFM	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	3 3 3	No No No	Yes Yes Yes	Yes Yes Yes	No No No	N/A (2) Yes	100 100 100	100 100 100	Yes No Yes	#12 - American Standard Inc / Trane Co. #151 - United Technologies / Carrier A/C #164 - York International	Additional Vendors: #13, 42, 80, 105, 120, 149

(1) Depends on Type of Equipment

(2) Performance Rating

(3) ETL &amp; UL Listed

(4) Components Are Listed

(5) UL &amp; AGA Listed

(6) Only Explosion-Proof

(7) ASME Section 4

(8) 601r Only

(9) AGA Approved

(10) Different Components Used

(11) Slower Feed Speed

(12) By Request

On This Page:  
Air Conditioning Equipment (Except Explosion-Proof Units & Compressors)

## 5011z Vendor Selection Tables

[illegible]

**On This Page:**  
**Explosion-Proof Air Conditioning**

(1) Depends on Type of Equipment	(5) UL & AGA Listed	(9) AGA Approved
(2) Performance Derating	(6) Only Explosion-Proof	(10) Different Components Used
(3) ETL & UL Listed	(7) ASME Section 4	(11) Slower Feed Sipped
(4) Components Are Listed	(8) 6011/2 Only	(12) By Request

**DISTRIBUTION**

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ATTN: FBO/BDE/ESB (75)

Defense Technical Info. Center 22304  
ATTN: DTIC-FAB (2)

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